TECHINDY

School of Science & Engineering

Proposed Location: Near West-side Indianapolis

Charter School Application Submitted to Office of Education Innovation,
Office of the Mayor of Indianapolis
October 21st 2016

Charter Applicant Information Sheet

This sheet must be attached to the Prospectus and Full Application, and follow the cover page. Please type the information requested.

Name of Proposed Charter School: TechIndy School of Science and Engineering

Proposed School Address (if known): tbd in near-West side

School District in which Proposed School would be located: IPS

Legal Name of Group Applying for the Charter: Ed21 Charter Schools

Applicant's Designated Representative: Mahmoud Sayani
Address: c/o The Mind Trust
1630 N. Meridian St., Suite 450
City: Indianapolis
State: IN
Zip code: 46202
Daytime telephone: 317-822-8102
E-mail address: msayani@themindtrust.org

The proposed school will open in the fall of school year: 2017

Proposed Grade Levels & Total Student Enrollment

_____	School Year	Grade Levels	Maximum Student Enrollment
First Year	2017	9,10	200
Second Year	2018	9,10,11	300
Third Year	2019	9,10,11,12	400
Fourth Year	2020	9,10,11,12	420
Fifth Year	2021	9,10,11,12	440
Sixth Year	2022	9,10,11,12	460
Seventh Year	2023	9,10,11,12	480
Maximum			480

Is this a single-gender or co-educational school? Co-educational

If single-gender, please indicate who will be served by school:
Indicate "Girls" or "Boys"

Are you planning to work with a management organization? No
Indicate "Yes" or "No"

Have you submitted this application to other authorizer(s)? No
Indicate "Yes" or "No"

Do you plan to submit this application to another authorizer before the Mayor's Office makes a final determination on your application?
No

Have you submitted any other applications to an authorizer in the previous five (5) years? No

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I. Vision

A. Mission

The school's mission is to enable students from diverse backgrounds to participate fully in the innovation-based, globalized, multi-cultural world of today, becoming leaders in STEM careers and creating a better world for their families, their communities and for future generations.

The school will engage students in disciplinary and interdisciplinary inquiry and project-based learning experiences in STEM, the Arts and the Humanities so that they can acquire and apply knowledge in an integrated manner towards the problems of their generation. Students will develop the skills, mindsets and strategies to live their lives successfully, and to build communities of respect, courage, integrity and excellence.

B. Need

The Indiana Department of Workforce Development[1] indicates that jobs in STEM fields will grow at approximately 17% compared to a 11% growth rate for non-STEM jobs, and the National Math and Science Initiative states that *"...the new literacy of the 21st century includes math and science."* [2] STEM fields pay higher than non-STEM jobs; according to Change the Equation[3] – new graduates in health sciences, computer science and engineering fields earn 10% - 29% higher than new graduates in other fields, and only 3% of new graduates in STEM fields are unemployed compared to 7% in non-STEM fields. Indianapolis is home to a number of STEM industries, such as Lilly, Dow and Roche in the biosciences, Rolls Royce and Cummins in the vehicular industry, and Interactive Intelligence in the software industry. The 16Tech Innovation zone in Indianapolis is a major new undertaking to attract new technology companies to the area, and its location close to the IUPUI campus provides strong research support in the biosciences and computer sciences.

In consultation with 16Tech, the Westside CDC and RiverWest, we have identified Riverside and the near-West side as a potential location for the school. We believe this is strategically a good fit for the school, as there is the potential for strong partnerships to be formed with 16Tech, IUPUI, and technology companies in the area to serve students with a STEM-focused high school. 16Tech is interested in creating a long-term pipeline of STEM professionals for the industries that will be located in this zone, and they see the value of a high-school that will provide a strong foundation in STEM fields and that will prepare students for university programs such as those offered in Informatics and Biosciences at IUPUI. Proximity to these companies and to IUPUI will provide access to mentors, internships, real-world projects in the STEM fields, and to undergraduate coursework.

Using 2010 census tract data[4], there are approximately 2,500 school age children between the ages of 10-14, and 2,600 school-age children between the ages of 15 and 19 in the census

[1] http://www.hoosierdata.in.gov/FD/overview.aspx (Select STEM occupations, Region EGR 5)
[2] https://www.nms.org/Blog/TabId/58/PostId/10/quotable-quotes-about-math-science.aspx
[3] http://changetheequation.org/stemtistics
[4] http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_DP_DPDP1&src=pt

tracts within a 4-mile radius centered at the 16Tech zone. Figure 1 shows there are three high schools in this area: George Washington High with 513 students (D-rated and having seen a drop from 848 students in the last year); Providence Cristo Rey (a private school) with 236 students (C-rated); and Indy Metropolitan High (D-rated) with 250 students. Thus, the high schools in this neighborhood are currently serving less than 50% (1,026) of the total 2,600 high school-age population. Table 1 shows the graduation and college readiness performance of the three schools: Washington and Met had low graduation rates, and all three schools had weak performance with students taking or passing an AP exam. Providence Cristo Rey and Indy Met had very low pass rates for Biology 1 ECA.

	George Washington	Providence Cristo Rey	Indy Metropolitan
Enrollment (2015-16)	513	236	250
Rating (2014-15)	D	C	D
Black & Latino as % of total	67%	89%	84%
F&RM students as % of total	72%	93%	77%
SpecEd students as % of total	27%	0.8%	20%
ELL students as % of total	15%	2.5%	4%
ECA Biology 1 pass (2014-15)	43%	14%	3%
Graduation rate	55%	94%	48%
Dropout rate	20%	-	23%
Students passing an AP exam	0%	n/a	Not taken

Table 1: Enrollment and performance data on high schools in the target area

An analysis done by IFF indicates that the near-West side is a high-priority area for a high school, with the neighborhoods in this area being ranked 2nd and 3rd highest priority areas in Indianapolis – see Figure 2.

We have shown the need for a high quality high school in the near-West side. We have also shown that job growth in STEM careers is higher than in other fields – preparing students to enter STEM careers through appropriate education at the high school level will increase the numbers of students who are able to take advantage of this job growth.

Thus, there is a need for a high school that provides a culture of high achievement with a focus on STEM disciplines. A school that provides a rigorous curriculum, pedagogies of deeper learning, and that offers pathways of learning that prepares students for careers in Science and Engineering will provide the neighborhood with a high school that prepares students for the future, while providing students with a learning environment that enables them to be successful. TechIndy School of Science and Engineering - a school that combines the prestigious International Baccalaureate curriculum, combined with the engineering pathways of Project Lead the Way, the deeper learning pedagogies of project-based learning and personalized learning, and a focus on global competence and youth leadership - will fill this need.

STATSINDIANA

Indiana's Public Data Utility

Census Tract Interactive Map, 2010

Zoom in and select a tract below to see population and housing fast facts.

Pop-up not showing the district you clicked?

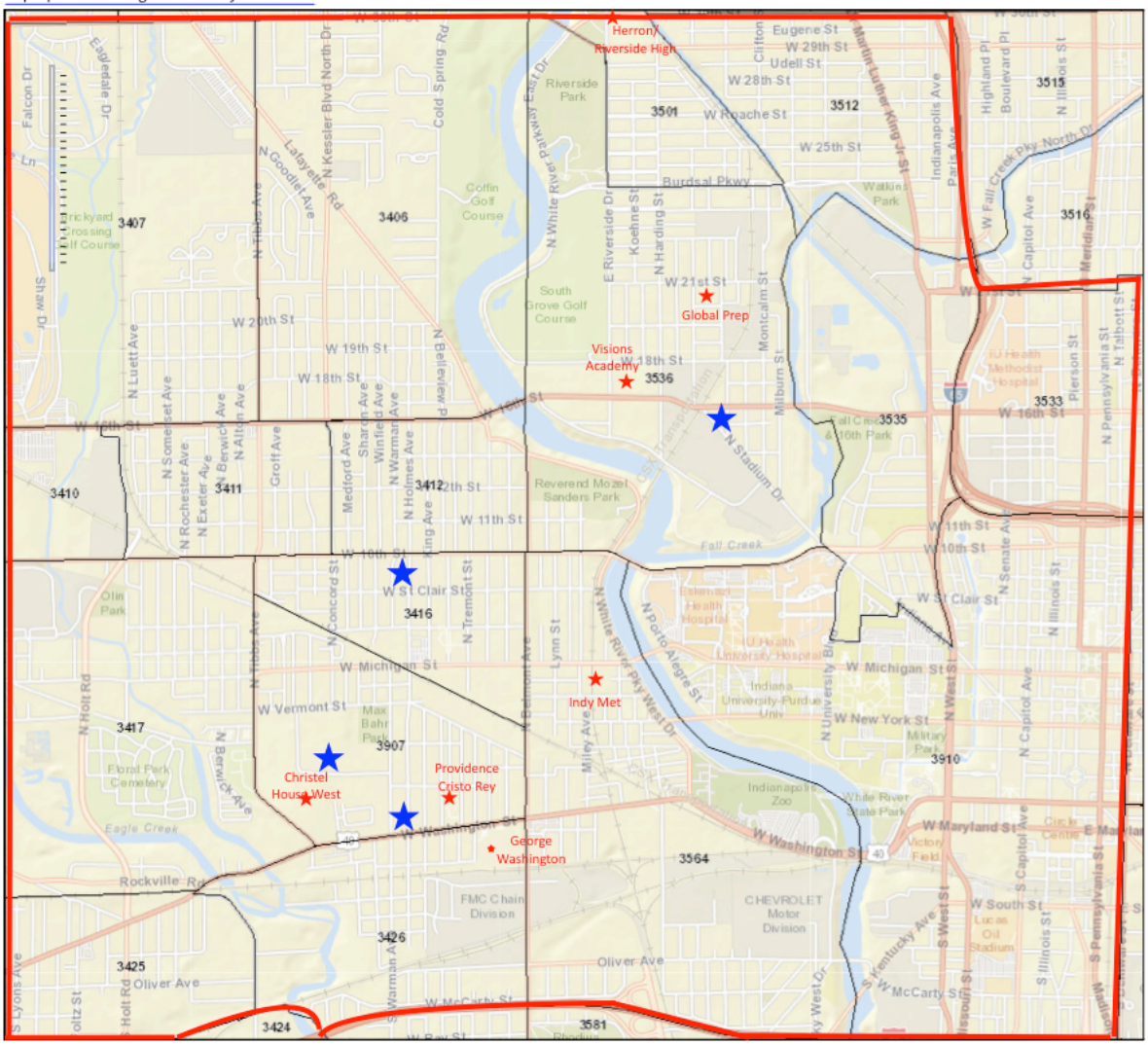
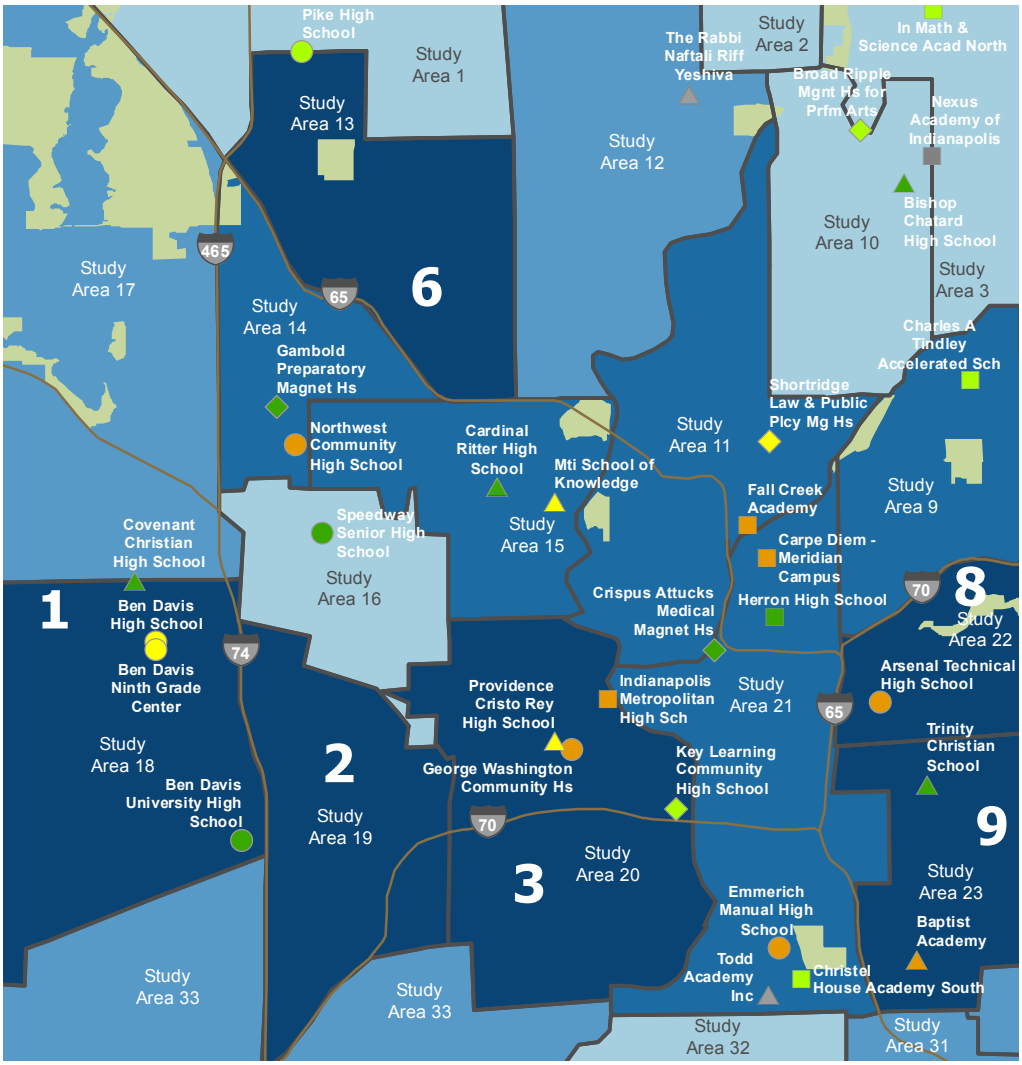


Figure 1. Census tracts and Public Schools in the Riverside and near-West area. Red Stars indicate location of current schools; blue stars indicate potential locations for TechIndy.



Area Rankings for Grades 9-12

- 1 - 10 (High Priority)
- 11 - 19
- 20 - 28
- 29 - 37 (Low Priority)

School Performance

- A - Exemplary Progress
- B - Commendable Progress
- C - Academic Progress
- D - Watch
- F - Probation
- No Grade

	Study Area 13	Study Area 14	Study Area 15	Study Area 19	Study Area 20
Service Gap 9-12	-1003	-608	-614	-1243	-1154
Service Level 9-12	42%	29%	27%	12%	19%
9-12 Gap Rank	6	16	15	2	3
Population Ages 5-17	5,547	3,769	3,805	4,112	4,736
Pop. Density Ages 5-17 (per Sq. Mi.)	689	851	633	539	422
Percent Below 185% Federal Poverty Level	60%	72%	75%	79%	78%
Percent Who Speak English Less than Very Well	6%	12%	13%	5%	2%
Percent Who Moved in Last Year	16%	24%	15%	16%	14%
Percent of Adults without a Bachelor's Degree	69%	86%	89%	91%	92%

Figure 2 IFF Analysis of high-school need in near-West side

C. Goals

TechIndy's academic and non-academic outcomes are summarized below, and the summary sheets for each goal are provided in Appendix 1.

Academic Performance Goals

1. *At least 65% of seniors (increasing to 75% in later years) will graduate with an International Baccalaureate Diploma, or an IB Career Certificate with a PLTW career pathway certificate.*
2. *At least 50% of graduating students (increasing to 70% in later years) will obtain admission to a STEM associate degree or bachelor's degree program.*

Organizational/Non-Academic Outcomes

3. *At least 60% of teachers (increasing to 75% in later years) show competence in the school's pedagogical model as measured by school leadership's evaluations of teacher practice.*
4. *At least 70% (increasing to 85% in later years) of stakeholders (students, parents, teachers) exhibit satisfaction with the school as measured by a school-designed survey administered by a community-based organization.*

II. Educational Services Provided

A. Educational Model

1. Key Elements of the School model

The school's proposed educational model is focused on three pillars: creativity and innovation, global competence, and youth leadership, as depicted in Figure 3.

Figure 3: TechIndy's three pillars of educational focus

a. Creativity and Innovation

Klaus Schwab of the World Economic Forum theorizes that the global economy has entered a Fourth Industrial Revolution[5] , "*... characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres*." This revolution is driven by innovation and "*in the future, talent, more than capital, will represent the critical factor of production"*. Leading educators like Tony Wagner at Harvard believe that "*if we are to remain globally competitive in today's world ... we need to develop the creative and enterprising capacities of all our students" (Wagner, 2012, p.4)*. He also states*:* "*I have come to understand that the most essential education challenge today is to graduate all students innovation-ready*"[6]

Benjamin Bloom (1985) studied how experts in various fields learn and found that they progress through three stages that involve: play and learning of fundamental skills; practice under supervision, developing the ability to recognize patterns and underlying structures; and finally developing their own expression and creativity in the field. Bloom's taxonomy of learning indicates that there are different objectives to teaching and learning and a higher depth of learning takes place as learners move from obtaining a foundational base of knowledge to applying that knowledge, analyzing situations and critically thinking about situations and information, and finally creating with the knowledge they have acquired. Creativity and innovation are thus the highest forms of learning, and TechIndy's educational model is designed to lead learners through this taxonomy of learning with the ultimate goal of developing their creative and innovative capacities.

TechIndy's educational model involves developing disciplinary learning that complies with, and exceeds, the Indiana Core40 requirements and Indiana content standards. This disciplinary learning will use an inquiry-action-reflection pedagogy as discussed in Section IIA-2. Students will take rigorous IB courses; Project Lead The Way pathways in Engineering, Computer Science and Biomedical Science; and studies in global issues. They will also learn how to learn using an IB course on approaches to learning, and through the use of metacognitive strategies.

These programs will be enhanced through an inter-disciplinary approach that purposefully integrates the Arts and the Humanities with STEM disciplines in a way that enhances students' perspectives and creativity, and provides them with an understanding of the human condition. Students will undertake inter-disciplinary projects that will be developed by accessing training at High Tech High in San Diego, and enhanced with the frameworks for inter-disciplinary learning developed by Boix-Mansilla at Harvard (2007 and 2010). A major element of the project-based learning at Tech-Indy will be to focus students on developing innovative solutions to engineering and humanitarian challenges, similar to the work done at Olin College of Engineering and PennState's department of Humanitarian Engineering.

Two other elements will further develop learners' creative capacity:

i. Students will be required to take one course in the Arts every semester
ii. Learning and teaching in all courses will be infused with the Studio Habits of Mind

[5] https://www.foreignaffairs.com/articles/2015-12-12/fourth-industrial-revolution
[6] http://www.edweek.org/ew/articles/2012/08/14/01wagner.h32.html?r=1729546645

(Hetland, 2007). These develop students' abilities to observe, focus, envision, stretch to new ideas, and persist and reflect.

b. Global Competence

Global competence is the second pillar element of the school model – *"preparing our students to participate fully in today's and tomorrow's world demands that we nurture their global competence which herein is defined as the capacity and disposition to understand and act on issues of global significance"* (Boix-Mansilla and Jackson, 2013, p.2). TechIndy will partner with The Asia Society to access its global studies curriculum, and will become part of its International Studies Schools Network, whereby students will be able to connect with students from schools around the world and collaborate virtually on projects of mutual interest that are related to global issues. This collaborative work will develop cultural competence as students engage with learners from different cultures and faiths, and will develop their abilities to understand and engage with global issues from vastly different points of view.

International-mindedness is also an essential objective of the IB, and by becoming an IB World School, TechIndy will have access to a broader network of international IB schools with which to build global competence. IB courses also have global competence elements built in – for example, the IB Language and Literature requires teachers to select fiction and non-fiction from around the world, including texts that have been translated from other languages.

A school-designed Global Competency Capstone seminar and project will be a requirement for graduation and will engage students in deep discussion around global contexts and issues, and will be the focus for interactions with other schools and for senior student projects.

c. Youth Leadership

Youth Leadership is the third pillar of the school model – the National Conference of State Legislatures found that "*many 15- to 26-year-olds do not understand the ideals of citizenship; are disengaged from the political process, and have limited appreciation of American democracy*" (NCSL, 2006). Educational philosophers have theorized that developing good citizens is a key objective of education, the other being to develop young people's ability to participate in the economy. It is TechIndy's belief that a key responsibility of a school is to develop good citizens who have strong social-emotional skills and good character; who give back of their knowledge and effort to improve their communities; and who understand how to use the systems of democracy to effect positive change locally and globally.

Researchers around the country – including CASEL[7] and CCSR[8] - stress the need for social-emotional learning in schools and several states have adopted standards for social emotional learning. Research has also shown that developing social-emotional skills through school-wide integrated interventions help improve academic outcomes. TechIndy will utilize an Advisory

[7] Collaborative for Academic, Social, and Emotional Learning – www.casel.org
[8] Chicago Consortium on School Research - https://consortium.uchicago.edu/node/1649

model using the framework from Engaging Schools (www.engagingschools.org) to build academic behaviors, strategies, mindsets, and social emotional skills. The school schedule will have a dedicated 20-minute advisory session every day where mixed-grade students will meet with their advisor and engage in activities and discussions to develop SEL and character. They will remain in the same group for their entire four years, allowing them to build a sense of belonging and caring within the group. SEL and character development will also be developed in every classroom through explicit instruction and reinforcement by subject teachers, The Engaging Schools framework will be enhanced using the mindsets work of Carol Dweck at Stanford (https://www.perts.net/resources), and the RULER emotional intelligence framework developed at Yale (http://ei.yale.edu/ruler/) and the VIA character virtues (http://www.viacharacter.org/www) will be used as a framework for developing character.

A second element of youth leadership is service learning and civic engagement, in which students "use academic knowledge and skills to address genuine community needs" [9]. Using the standards developed by the National Youth Leadership Council, the school will set aside dedicated time every Wednesday afternoon for service projects and civic action in partnership with community based organizations. Through these projects, students build their own social-emotional skills and character, learn how to use agency and the civic process to effect change.

2. Pedagogical model

The pedagogical model to be used at the school is shown in Figure 4. At the core of all learning and teaching is the IB core pedagogy of Inquiry-Action-Reflection, which involves a constructivist approach to learning and which includes cognitive science principles of how people learn, including the use of metacognition and active inquiry into concepts to determine the underlying structure of knowledge (Bransford et al, 2000). The principles of project-based learning (Krajcik and Blumenfeld, 2006) will be infused into the teaching and learning process and a significant part of a student's schedule will involve engagement in authentic, interdisciplinary real-world based projects where students transfer their disciplinary knowledge to new situations (Perkins and Salomon, 1988). However, it is important that the school maintains a disciplinary focus, as students need to learn the ways of thinking and the core concepts that are the core of each discipline before they can integrate them successfully. As Howard Gardner (1999) states, the disciplines comprise *"the most powerful ways that human beings have devised for making sense of our world" and they are "the points of entry for considering the deepest questions about the world"* (p. 157).

Educational technology will form a cornerstone of the school's pedagogy. The school will use a blended learning approach for English/Language Arts and Math using proven technology like Accelerated Reader and Accelerated Math to ensure that students who enter below grade-level in these foundational skills are able to reach proficiency within the first year.

All classes will be taught incorporating the Studio Habits of Minds (Hetland et al, 2007). By using these habits of mind - which can be applied in all disciplines - students use principles from cognitive sciences while moving towards higher levels of cognition in Bloom's taxonomy,

[9] National Youth Leadership Council - https://nylc.org/service-learning/

and develop character mindsets of focus, persistence and conscientiousness.

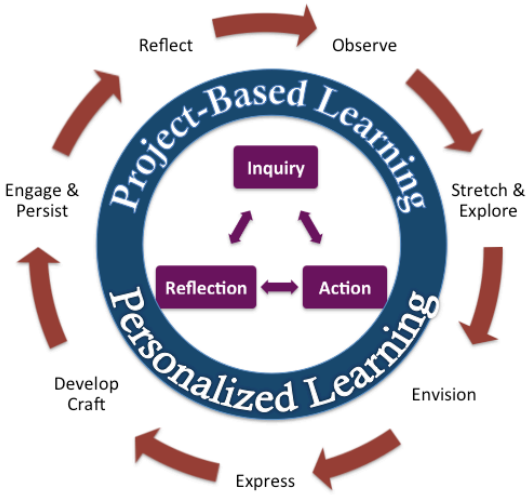


Figure 4 Pedagogical Model to be used at TechIndy

3. Culture

Respect – every person treats every other person in the community with care, compassion and dignity

Courage – we embrace new ideas and experiences; tackle difficult issues; act morally and ethically

Integrity – we are honest, true to our word, and deliver what we commit to

Excellence – we strive for the very best in all our effort and seek the same for all members of our community

Community – we are together – helping each other, caring for each other and making all of us successful

The focus of the culture at TechIndy will be to develop a sense of belonging, care and support for all members of the community. The core values of *Respect, Courage*, *Integrity, Excellence and Community* embody the essential elements of the school culture that will be embraced by all members of the school community. In keeping with the values of *respect* and *community*, students, teachers and parents will be actively involved in creating and enacting the practices and structures that uphold the culture of the school.

Some practices that will be used at the school to reinforce the culture include:

- Weekly *"Caught in the Act"* award where students are nominated by teachers for small acts that demonstrate the school values
- Monthly *"TechIndy Spirit"* Award where students and teachers nominate students or any staff member for exemplifying the spirit of the school
- Weekly "*Celebration of Student Work*" where students will come forward in a school

assembly and nominate their own work for recognition. The student body will vote on whether the work presented meets the school's excellence standard.

- An *Honor Roll* every semester, where students are recognized in multiple ways with the student body, parents and school leadership.

An important aspect of the school's culture is that it will include a democratic philosophy with the principle that it is the school's responsibility to help students learn to be responsible citizens by having them participate in a democratic community. Thus, teachers, students and parents will all have a voice in what happens in the school – in its policies, program and events. The school will use broad consultations with the three stakeholder groups regarding school operations policies, decisions on where to target funds, and priorities for the school. The school will also use these stakeholders in fostering appropriate behavior through the use of restorative and pro-active conversations involving students and teachers, peer juries involving teachers and students, and restorative conferences involving parents and community representatives.

The aspect of school culture relating to teachers' work will be one of collaboration, open classrooms and joint responsibility for implementing and enhancing the school's pedagogical model in practice. The school will create an environment of collaborative growth, where teachers are encouraged to call on each other for support and to learn from each other's practice. They will work together to create curriculum units, assessments, study assessment data to identify areas for changing practice, and to address student performance. Teachers will feel valued in the school and will participate in holding each other accountable for student performance and will ensure that they make time for students and parents. Parents will feel welcome in the school and know that they are encouraged by teachers to take an interest in their children's learning and growth.

4. School Calendar and Hours of Operation

The school calendar will comprise of 190 school days as shown in Table 2 below. One PD day per month has been scheduled to ensure teachers receive professional development on a regular basis in the school's pedagogical model. Due to the length of the second semester, an additional day off along with a PD day will be scheduled in April to give students an additional four-day weekend.

	Fall Semester	**Spring Semester**
Semester Start	August 1st 2017	January 2nd 2018
Semester Break	October 2nd to 6th	March 19th to 23rd April 23rd
Public Holidays	Sep 4, Oct 9, Nov 10, Nov 23-24	Jan 15, Feb 19, May 28
Professional Development Days	4 days	5 days
Semester End	Dec 15th 2017	June 15th 2018
Number school days	85 days	105 days

Table 2. School Calendar for school year 2017-18

The school will run from 8:30am to 5:00pm. The day will begin with a ten-minute school-wide sharing of music, poetry, movement and mindfulness to help focus students on the work of the day ahead. Students in Grades 9 and 10 will have 45-minute periods for English/Language Arts and Math every day, while students in Grades 11 and 12 will have a 90-minute double-block for ELA and Math three times a week. All students will attend an Advisory session of twenty minutes every day. Following this, the daily schedule will be split into three blocks of ninety minutes each – student schedules will vary depending on course selection and whether the students are in Grades 9-10 or 11-12. Figure 5 provides a typical schedule for a Grade 11 student.

On Mondays and Fridays, students will have one hour at the end of the day for extra-curricular activities and athletic practice; on Tuesdays and Thursdays, this time will be used for office hours and individual tutoring or independent study. On Wednesday afternoons, all students will assemble for thirty minutes of celebration of student work, and two hours of community service and/or participatory action research, supervised by responsible community members and parents in partnership with community-based organizations. This gives teachers an opportunity to participate in collaborative planning and professional learning.

Science, Humanities and PLTW teachers will teach three blocks of ninety minutes per day, and will take one advisory group for half an hour every day. They will also host an extra-curricular activity on Mondays and Fridays for an hour each day, and will have a rotating lunch duty. This leaves teachers with ninety minutes of planning and grading time four days a week, and two hours of collaborative planning and professional development once a week. Total academic contact time with students is expected to be 25 hours per week, with an additional two hours of extra-curricular support per week.

5. A day in the life of a Student

Jessica is an 11th grade student who joined TechIndy in Grade 9. When she enrolled, she was below grade-level in Math, but due to the personalized learning approach used at TechIndy, she passed her ISTEP+ in Grade 10 and is looking forward to getting her IB Career certificate and her PLTW certificate in Biomedical Science.

8:15-8:30 am	Jessica arrives at school and is greeted at the door by the teacher on duty. She's happy to see her advisor, Ms. Kessia Jones is on duty today, Ms. Jones asks Jessica how her mother, who's been having a problem with a slipped disc, is doing. Jessica responds saying her mother is better, and proceeds to her locker to get her books for the morning and then goes to the gym for the school opening session. While she waits in the gym, she practices the song she will be performing with her advisory group at the morning session.

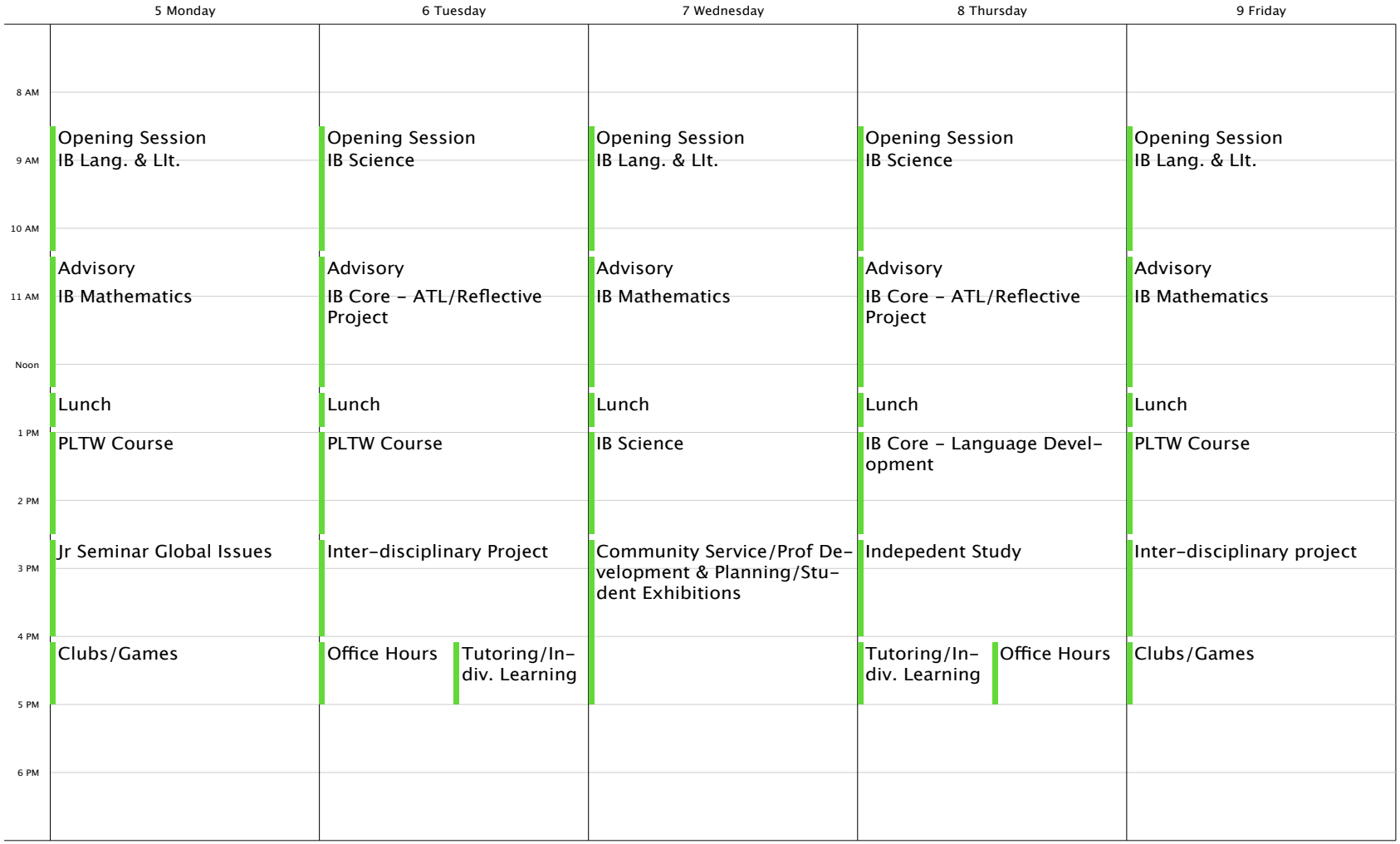
8:30 – 8:40 Opening session. The Principal starts out the morning session by welcoming students back for another week at school, and asks Ms. Jones to open the session with her advisory group (a different advisory group performs at the opening session each day). Jessica's friend, Maritza, starts out by reciting a spoken word poem she has written on the experience of refugees at the Greek border. This is followed by a choral performance by the whole advisory group of the song "Firework" by Katy Perry, an inspirational song to get students motivated for the week. The opening session winds up with a couple of announcements from the Assistant Principal.

8:45 – 10:20 The first lesson of the day is IB English/Language Arts. Here, the class is comparing Toni Morrison's *Beloved* and Alice Walker's *The Color Purple.* Seated in a circle to enable a seminar-style discussion, the students discuss the main themes in each work and how the two authors develop these themes using events, imagery and characters. After a half-hour discussion, where the students do almost all the talking using a "barn-raising" style of discussion (McCormick and Kahn, 1982), students then work independently on their laptops for a half-hour to write a two-page essay on a theme of their choice in the two works. Finally, in the last half hour, students come together in small groups to write a short one-act play or dance movement to express one common theme from the two books. They will perform this to the whole school in the next twice-monthly school-wide student performances/exhibitions.

10:25 – 10:45 Jessica then goes into the daily advisory session – a group of mixed-grade students assigned to an advisor for their entire stay in school. After five minutes of yoga, the advisor asks each student to offer one success and one challenge to the group from an academic or personal aspect of their life. The group's job is to encourage each student and offer help where needed to ensure students develop the four academic mindsets of belonging, growth, self-efficacy and value. Through this process, students are also developing social skills of empathy and listening to each other. The students in the group then set their individual learning goals and create a study plan for the week, which will be reviewed on a daily basis during advisory.

10:50 – 12:20 The next lesson is IB Mathematics. As the semester gets underway, the material is getting tougher, but Jessica knows Mr. Francis, the teacher, is there to support her and she can always lean on her advisory group for help. Today's area of inquiry is derivatives, which Jessica has found tough to master but she feels the problem they are working on today will help her understand a little better. Last week, they went to a nearby small factory making automotive parts and collected data on sales, units produced and costs per month. The problem that Mr. Francis has given them today is to use calculus to determine the marginal cost and the profit-maximizing quantity for the factory. Jessica works with her small group to plot the cost and profit functions using a computer tool, and then they work out the solutions for the problem. When they have completed the activity, Mr. Francis assigns them another problem to work on collaboratively that involves calculating the acceleration of different vehicles. In the last five minutes of class, the students take time out to complete their individual metacognitive journal reflecting of the ways of thinking that helped them in today's lesson.

Grade 11 Schedule



Eastern Time Time Zone

12:25 – 12:55 Jessica is glad that it's lunchtime. She goes to the cafeteria with her friends lunch, and they chat about their day and what's going on in their lives.

1:00 – 2:30 Jessica goes into her Project-Lead-the-Way class – Principles of BioMedi Science. Today the class is investigating the difference in chromosomes betwe healthy cells and cells with genetic mutation. In small groups, the students bu models of DNA molecules and examine cells with different genetic combinatio Conducting their own research on their laptops, they determine what dise correlates the cells they have been given and each group makes a presentation to class.

2:35 – 4:00 In the final class of the day, Jessica goes to the Junior Seminar on Global Issu The class is investigating the extent of climate change and what contributes to Jessica's group has connected with a high school class in Brazil to collaborate this project. Today, they plan out their semester-long investigation, which is create an inventory of climate change effects in the US and in South America, a to investigate the relative contribution of vehicles, energy plants, and varic industries towards carbon dioxide in the atmosphere. They have a Skype call w their counter-parts in Brazil to discuss the progress they have made and share th proposed investigation methodology.

4:05 – 5:00 Finally, it's time for some extra-curricular activity. The last hour of the day dedicated to clubs and games. Jessica goes to the gym to join the school basketb team for practice, before heading home.

6. A day in the life of a Teacher

8:00-8:30 am Mr. Hernandez arrives at school and pauses at the main entrance to chat witl couple of parents who are dropping off their children to school. He takes an inter in his students' lives outside school and he knows that parents play a major role their children's success. Stepping aside from the general bustle, he speaks Stefan's father, Mr. Zolov, about Stefan's progress with English Langua Learning. He praises Mr. Zolov (a recent immigrant) for his son's progress a encourages him to support his son further by discussing current affairs at home their mother tongue and in English to support language development. Af wishing Zolov a good day, Mr. Hernandez goes to his workstation to organize work for the day.

8:30 – 8:40 Opening session. Mr. Hernandez enjoys today's performance of "Firework" Ms. Jones' advisory group and is pleased to see the empathy in the students arou him for the refugee situation. He reflects on his group's preparation for their tu tomorrow – they have been preparing a short Japanese Kabuki act with the help the Japan-America Society of Indiana, in keeping with the school's focus on glo competence. He thinks his group is really enthusiastic and he's looking forward seeing them perform.

8:45 – 10:20 Mr. Hernandez's first period is non-contact time. He is a Physics teacher and has two collaborative planning meetings to attend. In the first meeting, he works with the other Physics teachers in the school to collaboratively review where they are with the teaching of the current unit on electro-magnetism. They study their formative assessments, and identify that students have not yet understood the concept well. They discuss an inquiry project where students will design and build a small generator to reinforce their conceptual learning.

In the second meeting, he meets with the PLTW teacher and the Music teacher that he is collaborating with on an inter-disciplinary robotics project for Grade 10. They review their unit plan and finalize the rubric for the assessment of student projects that were developed using student input, and make sure that the standards for all three disciplines are represented adequately in the rubric.

10:25 – 10:45 Mr. Hernandez next has his advisory group. The group is chatting excitedly about their upcoming Kabuki performance, but Mr. Hernandez knows that he has to first steer them towards working on some emotional intelligence tasks. They talk about instances where they have experienced frustration and anger, how they can recognize these emotions and what they can do to manage these emotions. He knows Eric and LaToya in his group have had some difficulty with this and he ensures they open up to discuss situations, which frustrated them. They then work on their individual study plans for the week, and spend the last five minutes rehearsing their performance for the next day.

10:50 – 12:20 The next period is a Physics lesson with grade 10 students. Mr. Dieng, a visiting teacher from Senegal is present in the class today and will be team teaching the class. Mr. Hernandez is glad to have a thought partner in the classroom. He draws out their prior knowledge and through a couple of small-group activities that highlight basic concepts of electro-magnetism. The class gets back together and shares out what they have learnt. Mr. Dieng then introduces the class to the project of building a small electric generator. He conducts a mini-lecture on the calculations needed for the project and assigns the students to work in small-groups on their laptops using a Khan Academy activity that builds their skills with the calculations. Mr. Hernandez then takes over and guides the whole class through an inquiry discussion on how generators work and gives them some web-site links to explore in small-groups. Their task for today is to create a poster that describes how motion is converted to electricity, to identify what parts they will need to build a generator with the target specifications given for the project, and determine what process they will follow to build the generator. Both teachers circulate, asking questions to push student thinking as they work in small groups. In the last five minutes, Mr. Hernandez gives the signal and students pull out their metacognitive reflection journals to reflect on their thinking and problem solving strategies.

12:25 – 12:55 Mr. Hernandez usually has lunch with other teachers, but today Jakina from Grade 11 has asked for some additional help with her IB Physics where she is having trouble with a concept in waves. He spends 10 minutes with her, scaffolding her thinking as she grapples with the mathematical calculations, and asks her to think about what experiment she could do with real materials to help her visualize the problem. Jakina talks through carefully what she might do, and Mr. Hernandez enthusiastically commends her and tells her to come back when she has done her activity to reflect on what she has learnt.

1:00 – 2:30 Mr. Hernandez goes to his next class, which is the inter-disciplinary unit in robotics. He works with the PLTW teacher and the Music teacher as the student teams work collaboratively on their projects. He is impressed to see how students respond with excitement as they work with the Music teacher on how they can change the movement of the robot in time with a piece of music they choose. Mr. Hernandez spends the period with a couple of groups to help them work through the concepts of how friction will affect the design and how the robot will use gears in motion.

2:35 – 3:20 In the final class of the day, Mr. Hernandez goes to his Grade 11 IB standard-level Physics class. Ms. Porter, the Dean of Academics, comes in for an informal ten-minute observation. The class greets Ms. Porter and she engages with the small groups to review the task they are working on and to gauge their understanding of the concepts. She also spends some time quietly observing how Mr. Hernandez deals with an emotional outburst between two students in the class. She is pleased that Mr. Hernandez uses five minutes of class time in the practice of restorative conversations to alleviate the tensions and pro-actively reinforce emotional self-awareness and management. Overall, she knows Mr. Hernandez is a great teacher and makes a note to commend him and then offer some suggestions on how he might differentiate better for a couple of students in the class.

3:25 – 5:00 In the last session of the day, Mr. Hernandez gets on to Edmodo – the school's Learning Management System - and responds to several discussion posts from students in Grade 10. He also grades the last assessment from his grade 11 class, and posts some readings for his grade 12 class. At 4:30pm, he has an appointment with a parent of one of his students, where he discusses the student's progress and challenges with the parent. He encourages the parent and expresses his thanks for the parent's visit. After a long but rewarding day, Mr. Hernandez makes his way to the parking lot to go home to his own family.

7. School Discipline

A positive behavior intervention system (PBIS) will be developed to reinforce desired behaviors that are aligned with the school values, while discouraging undesirable behaviors. Issues with behavior will be handled primarily through the use of restorative practices and peer juries consisting of teachers and students. These mechanisms are effective ways to handle most incidents in the school, while reinforcing the democratic principal of participation, and avoid out-of-school suspensions as much as possible. The school discipline policy is provided in Appendix 2. TechIndy intends to partner with the Peace Learning Institute to develop the restorative practices at the school and a letter of intent to develop a MOU is provided in the Appendix.

B. Academic Standards

TechIndy's curriculum will meet, and students will be required to master, all Indiana Academic Standards as a baseline for graduation from TechIndy. As shown below, many of TechIndy's courses also exceed the Indiana standards. The school also has certain areas of learning – such as global competence, social-emotional and character learning, and service learning – for which Indiana does not have state standards. For these, TechIndy will use appropriate standards as discussed below.

1. Exit Standards for ELA, Math, PLTW, Global Competence and SEL

a. English/Language Arts

The IB DP Language and Literature course is approved by the Indiana Department of Education for Grades 11 and 12 and "fulfill the ELA requirements for the General, Core 40, Core 40 with Academic Honors" (IDOE, 2013). The Standard level versions of these courses count for two credits and the Higher Level versions count for four credits. These courses thus meet the Indiana Academic Standards for Grades 11-12, the learning outcomes for which are summarized in Appendix 3A.

The IB DP Language and Literature exceeds Indiana's Academic Standards through an additional domain entitled *Language in cultural context*, which enables students to "explore how language develops in specific cultural contexts, how it impacts the world, and how language shapes both individual and group identity" (IB, 2013). The four learning outcomes in this domain are shown in Table 3.

IB DP Language and Literature – Part 1: Language in Cultural Context
Analyze how audience and purpose affect the structure and content of texts e.g. language in political speeches, SMS messages
Analyze the impact of language changes e.g new vocabulary among young people, disappearance of vocabulary, the influence of government policy, the impact of electronic communication
Demonstrate an awareness of how language and meaning are shaped by culture and context e.g. ways in which language affirms identity, status of minority languages, the status of standard and non-standard forms of language

Table 3. Learning Outcomes for the additional domain of *Language in a Cultural Context* in IB Language and Literature

IB Language and Literature also requires that one of the selected texts be from a prescribed list in translation from another language, which adds another dimension of cultural and language appreciation that is not present in the Indiana standards.

b. Mathematics

The IB Mathematics course is approved by the Indiana Department of Education for Grades 11 and 12 and "fulfill the Mathematics requirements for the General, Core 40, Core 40 with Academic Honors" (IDOE, 2013). The Standard level versions of these courses count for two credits and the Higher Level versions count for four credits. These courses thus meet the Indiana Academic Standards for Grades 11-12.

Appendix 3B maps the IB syllabus to the IDOE Academic Standards listed for Algebra II, Probability and Statistics, Pre-Calculus and Calculus. A majority of the standards for these courses are met by the IB Mathematics course. It should be noted that the Core40 diploma requires Algebra I, II and Geometry only. Thus, by requiring students to take IB Mathematics at either standard or higher level, TechIndy exceeds Indiana standards by providing learning in additional areas in Probability & Statistics, Pre-calculus and Calculus. It also has students engage in learning in two additional areas – trigonometry and vectors – and further requires an independent study in an area of mathematics of individual interest to students. Finally, when students take the Higher Level version of IB Mathematics, they also are engaged in an advanced study in one of three areas of their choice: calculus, probability and statistics or discrete mathematics, which are more advanced than the Indiana standards.

Students that struggle with the advanced content of IB Mathematics will have the option of taking IB Mathematical Studies, which meets the Indiana Standards for Algebra I, II and Geometry, thus serving as a culminating study of these courses which should have been taken in Grades 9-11 at TechIndy.

c. Exit Standards for Project Lead the Way Pathways

Graduating students will be expected to complete one of three PLTW pathways – Bioscience, Computer Science, and Engineering. In each pathway, students will complete a minimum of three, but typically four, PLTW courses as well as a capstone course in their senior year. The capstone provides a summative experience where students integrate the knowledge they have gained in the other courses in their pathway and apply their knowledge to create innovative solutions for pressing challenges of the 21st century. PLTW has developed standards maps for each of their courses against the Common Core ELA, Common Core Math[10], Next Generation Science Standards (NGSS), National Health Science Standards, and Standards for Technology Literacy. These documents are 80-100 pages long each, as they list the relevant standards for each lesson, and so are not included here. However, Table 4 provides an example of the standards map for two lessons from the Biomedical Innovations (BMI) and Engineering Design and Development (EDD) Capstone courses, and Appendix 3C provides the National Health Science Standards, as well as the Standards for Technology Literacy used in Table 4.

d. Exit Standards for Global Competence

The Grades 11-12 Global Issues Seminar and Capstone will utilize a combination of:

- The Asia Society's (www.asiasociety.org/education/global-competence-0) Graduation Performance System (GPS) outcomes, organized along four domains: Investigate the World, Recognize (different) Perspectives, Communicate Ideas, and Take Action
- The Next Generation Science Standards (NGSS) for Engineering Design, Earth Systems, Weather and Climate, and Human Impacts. The NGSS standards for Engineering Design comprise: Analyze a major global challenge, Design a solution for a complex real-world problem, Evaluate a solution, and Model the impact of proposed solutions.

[10] The Common Core ELA and Math standards are very close to the Indiana state standards for ELA and Math and so we have not developed separate maps from PLTW to Indiana standards.

- Indiana Academic Standards for Geography and History of the World and Global Economics
- Indiana Academic Standards for English Language, Mathematics, Science
- The IB DP subject guide for Global Politics

These standards are summarized in Table 5 below and detailed standards for the Asia Society's GPS and the NGSS are provided in Appendix 3D. An unit plan from the Global Issues Seminar and Capstone is showing in Appendix 5.

Taken together, and complemented with the Indiana State Standards above, the use of these standards in the Global Issues Seminar and Capstone will enable the school to meets is mission of developing leaders in a globalized, multi-cultural world. Additionally, the Indiana state standards for Geography and History of the World and for Global Economics are usually only met by students who take these courses as electives. By incorporating some of these standards in the Global Issues course, all students at TechIndy get a broader, well-rounded understanding of the world while developing a problem-solving and action-oriented mind-set.

e. Exit Standards for Social Emotional and Character Development

One of the key elements of TechIndy's educational model is character and social-emotional skills development in students. A 2015 status of Social-Emotional Learning (SEL) standards in the fifty United States by CASEL (http://www.casel.org/state-scan-scorecard-project) showed that only four states have developed free-standing standards for SEL with developmental progressions at the K-12 level – Illinois, Kansas, Pennsylvania and West Virginia – though CASEL has recently received funding to partner with eight additional states in the development of their SEL standards.

Kansas[11] has developed probably the most comprehensive set of standards and corresponding indicators with developmental progressions, and we will use these standards for grades 9-12 as summarized in Table 6 below. These standards use the five CASEL sub-domains, classifying them as Personal Development (self-awareness, self-management); Social Development (social awareness, relationship building); and Character Development (responsible decision-making). Kansas also adds a sub-domain called Core Principles under Character development, involving defining and developing a set of ethical and performance principles, as well as creating a caring community. Based on a review of current best practices in character development in schools, we will also add the following sub-domains to Character Development: Determination (which includes persistence and grit), Integrity, Pursuit of Excellence, Courage, Gratitude, Compassion, and Growth Mindset. Standards for these character sub-domains will be developed by the school community.

[11] http://www.ksde.org/Portals/0/CSAS/Content%20Area%20(M-Z)/School%20Counseling/Soc_Emot_Char_Dev/SECD%20FINAL.pdf?ver=2014-10-08-095527-790

2. School Policy for Promotion/Retention

The school is committed to ensuring that all students succeed, and research has shown that retention, particularly at upper grades, can create lasting damage to a student's ability to succeed. All students are expected to obtain a high school diploma by passing all required courses. Students will be promoted to the next grade in most instances, but will be expected to follow their personalized learning plan, and retake courses – or sections of courses - that they have not passed until they have demonstrated mastery. To increase students' chances of success, the school will ensure that students who are falling behind or not passing their courses are identified early and an appropriate remediation plan is developed and implemented rigorously to help the student catch up. The plan will include intensive tutoring with teachers, "big brother/sister" college students trained by the school, summer school, and on-line personalized learning. Students may also take credit recovery courses during the summer if they have not passed certain courses.

In a few cases, students who are failing a large percentage of their courses will require extensive intervention, which might include retention. Any retention will be done in consultation with, and consent of, the student and their family. The school will ensure any other supports, such as any health, home or emotional issues, are identified in the retention plan to ensure the student's success moving forward.

PLTW Biomedical Innovations Capstone Course – Sample Map to Indiana, NGSS and National Health Standards

Lesson	ELA	Math	NGSS	National Health Science
1.1	R.1, 6, 7, 8, 10 W.1-10 SL.1-5 L.1-4	N.Q.2 S.ID.1 S.IC.6	HS.LS1.2 HS.ETS1.1-1.3 DCI-ETS1.A-C Science & Engineering Practices Crosscutting Concepts – Systems	1.32 2.11, 13, 15, 16, 31,32 4.21 8.12, 8.21, 8.22, 8.23 11.31-35
2.1	R.1, 2, 4, 6-10 W.1, 2, 4, 6-10 SL.1, 2, 4, 5, 6 L.1,2,4	N.Q.1, 2, 4 SSE.1, CED.4 REI,1-3 S.ID.2,3,9 S.IC.1-6	HS.LS1.2 HS.ETS1.2, 1.3 DCI-LS1.A Science & Engineering Practices Crosscutting Concepts – Patterns, Cause & Effect, Scale	1.13, .31, 32 2.11, .13, .15, .16, .31, .32 4.21, 7.22, 8.12, .21-.23 10.11, 11.31-.35

PLTW Engineering Design and Development Capstone Course – Sample Map to Indiana, NGSS and Tech Literacy Standards

	ELA	Math	NGSS	Technology Literacy
1	R.1, 2, 4, 6-10 W.1-10 SL.1-6 L.1-6	N.Q.1-3, SSE.1, REI.10 F.IF.1, 4, 5 F.LE.1, 3, 5 S.ID.1, 2, 3, 4, 6, 9 S.IC.1, 3, 4, 6 S.MD.5-7	HS.ESS.3.1, 3.2, 3.5 HS.ETS1.1-1.4 DCI-ETS1.A Science & Engineering Practices Crosscutting Concepts – Patterns, Cause & Effect, Systems	1.9-12.J-M 2.9-12.W-Z, AA, EE 4.9-12.H-K; 5.9-12.G-L 6.9-12.H-J; 7.9-12.G-J 8.9-12.H-K; 9.9-12.I-L 10.9-12.I-L; 11.9-12.M-N 13.9-12.J-L; 17.9-12.N-Q
2	R.1, 2, 4, 6-10 W.1-10 SL.1-6 L.1-6	N.Q.1-3, SSE.1, 3; APR.1, CED.1, 2, 4 REI.3, 4, 10, 11 F.IF.1, 7, 8; F.BF.1 F.LE.1, 3, 5; G.CO.1,4,5,12 G.MD.4, G.MG.1-3 S.ID.7	HS.ESS.3.3, 3.4 HS.ETS1.1-1.4 DCI-ETS1.A Science & Engineering Practices Crosscutting Concepts – Patterns, Cause & Effect, Scale, Energy & Matter, Structure	1.9-12.J-M 2.9-12.W-Z, AA-FF 3.9-12.G-J; 4.9-12.I-K; 5.9-12.G-; 6.9-12.I-J; 7.9-12.G,H; 8.9-12.H-K; 9.9-12.I-L; 10.9-12.I-L; 11.9-12.M-R; 12.9-12.L-P 13.9-12.J-M; 16.9-12.J-N

Asia Society's Global Performance System	A student can initiate investigations of the world by framing questions, analyzing and synthesizing relevant evidence, and drawing reasonable conclusions about global issues	A student can recognize, articulate, and apply an understanding of different perspectives	A student can select and apply appropriate tools and strategies to communicate and collaborate effectively, meeting the needs and expectations of diverse individuals and groups.	A student can translate his/her ideas, concerns, and findings into appropriate and responsible individual or collaborative actions to improve conditions
Next Generation Science Standards: Engineering Design	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints and impacts	Use a computer simulation to model the impact of proposed solutions with numerous criteria and constraints on interactions within and between systems
Indiana State Standards for History of the World	Standards 1-4: Culture Hearths, World Religions, Population Characteristics Imperialism and Post-colonialism	Standards 5 and 6: Urban Growth, Innovations and Revolutions	Standards 7,10: Conflict & Cooperation; States & nation-states	Standards 12: Global Change
Indiana State Standards for Global Economics	Students critique various economic systems from around the world in order to identify strengths and weakness, and compare each	Students explain the role of monetary and fiscal policies in a global economy and how it relates to individuals' daily lives, businesses, and governments.	Students research the role of currency and international financial institutions in a global economy.	

Table 5. A summary of the four sets of standards used for the Global Issues course (standards for NGSS Earth Systems, Weather and Climate, Human Impact and IB Global Politics are not shown here to conserve space. They can be found in the Appendix). Note that the this table is not organized to map the standards on the vertical dimension

Social	Emotional	Character
1. Social-Awareness	**1. Self-Awareness**	**1. Responsible Decision Making & Problem Solving**
A. *Demonstrate awareness of the thoughts, feelings, and perspective of others.* • Evaluate opposing points of view. • Analyze the factors that have influenced different perspectives on an issue. • Differentiate between the factual and emotional content of what a person says. • Demonstrate empathy for others. • Analyze the factors that impact how they are perceived by others.	*A. Understand and analyze thoughts and emotions* • Analyze complex emotions. • Evaluate degree of personal emotion from common experiences. • Recognize direct positive and negative reactions to emotions/stress • Recognize indirect, negative reactions to emotion/stress • Interpret/anticipate how positive and negative expressions of emotions affect others in the interdependent world.	*A. Develop, implement, and model responsible decision making skills.* • Consider multiple factors in decision-making including ethical and safety factors, personal and community responsibilities, and short-term and long-term goals. • Organize personal time and manage personal responsibilities effectively. • Play a developmentally appropriate role in classroom management and school governance.
B. Demonstrate awareness of cultural issues and a respect for human dignity and differences • Recognize how their perspective and biases impact interactions with others. • Determine strategies to increase acceptance of others. • Evaluate how advocacy for the rights of others contributes to common good. • Appreciate how cultural similarities and differences contribute to the larger social group. • Challenge their perspective. • Evaluate now culture impacts historical events.	*B. Identify and assess personal qualities and external supports* • Evaluate the effects of various personal qualities • Analyze reflection and self-enhancement/self-preservation strategies. • Analyze resources for problem solving • Evaluate how behavior choices can affect goal success. • Evaluate external supports	*B. Develop, implement, and model effective problem solving skills.* • Identify personal feelings and the feelings of others involved with a problem and apply self- control and empathy skills. • Identify, analyze, and state what the problem is and identify and consider the perspectives of those involved. • Identify desired outcome and analyze if attainable. • Use creativity and innovation to generate multiple possible solutions and analyze each option in relation to resources, situation, and personal principles. • Identify and ask systematic questions that clarify various points of view and lead to the best solution. • Reflect and identify ways to improve. • Apply improvement strategies to future

Social	Emotional	Character
2. Interpersonal Skills	**2. Self-Management**	**2. Core Principles**
A. Demonstrate communication and social skills to interact effectively • Evaluate how societal and cultural norms and mores affect personal interactions. • Create positive group dynamics. • Present oneself professionally and exhibit proper etiquette. • Practice strategies to use constructively in social and other media.	A. *Understand and analyze thoughts and emotions*. • Identify and evaluate techniques to successfully manage emotions, stress and maintain confidence. • Analyze accuracy of facts/information/interpretation. • Evaluate quality of support for opinions. • Evaluate logical and emotional appeals. • Analyze cause/effect relationships. • Analyze consequences/outcomes of logical fallacies, bias, hypocrisy, contradiction, ambiguity, distortion, and rationalization. • Apply effective listening skills in a variety of setting and situations. • Recognize barriers to effective listening	A. *Recognize, select, and ascribe to a set of core ethical and performance principles as a foundation of good character and be able to define character* • Evaluate personal core principles with personal behavior (including ethical and performance principles). • Reflect upon personal core principles, appreciate them, and become committed to them.
B. Develop and maintain positive relationships. • Define social networking and its impact on your life. • Identify consequences of safe and risky behaviors. • Reflect upon personal role in applying and responding to peer pressure. • Develop understanding of relationships within the context of networking and vocational careers.	*B. Reflect on perspectives and emotional responses* • Analyze personal responsibilities. • Practice environmental responsibility. • Analyze consequence of ignoring environmental responsibilities. • Analyze civil/democratic responsibilities. • Analyze experiences that shape their perspectives. • Demonstrate empathy in a variety of settings, contexts, and situations. • Predict the potential outcome of impulsive behavior.	*B. Develop, implement, promote, and model core ethical and performance principles.* • Analyze community needs in the larger community, analyze effects on the local and larger community, design and critique positive, responsible action, and reflect on personal and community involvement. • Analyze ethical dilemmas in content areas and/or daily experiences. • Hold self and others accountable for demonstrating behaviors of good character throughout all school activities and in the community. • Reflect, analyze, and receive feedback on responsible actions including actions using academic and behavioral skills.

C. Demonstrate an ability to prevent, manage, and resolve interpersonal conflicts. • Analyze how conflict has played a role in society. • Utilize appropriate conflict resolution skills to prevent, prepare for, and manage conflict (for example, small group settings, workplace conflict) • Develop and utilize mediation skills to work toward productive outcomes.	C. *Set, monitor, adapt and evaluate goals to achieve success in school and life* • Evaluate factors that lead to goal achievement and success • Analyze the effect personal tendencies have on goals. • Analyze and evaluate consequences of failures/successes. • Analyze and activate strategies used previously to overcome obstacles including negative peer pressure. • Analyze factors that may have negatively affected personal success. • Determine the role of practice in skill acquisition and goal achievement. • Design plans for achieving short-term and long-term goals and establish formative and summative evaluation criteria.	*C. Create a caring community* • Evaluate characteristics of a caring relationship and hurtful relationship. • Manage personal behavior in family, school, and community that contributes to caring relationships. • Communicate respectfully and effectively in diverse environments. • Evaluate active listening skills of all parties involved before, after and during conversations. • Analyze ways to respond to ethical issues in life as they appear in the curriculum. • Utilize multiple-media and technologies ethically and respectfully, evaluate its effectiveness, and assess its impact. • Appraise and evaluate behavior as relational aggression and/or bullying. • Justify the value of personal rights and those of others to commit to ensuring a safe and nurturing environment within and outside of the school setting. • Conclude how to act in accordance with the principle of respect for all human beings. • Evaluate how bullying behavior impacts personal experiences beyond high school and in the work force. • Analyze and evaluate effectiveness of bullying intervention and reporting strategies.

Table 6. Summary of Kansas Social, Emotional, and Character Development standards for Grades 9-12 to be used at TechIndy

C. Curriculum and Sample lesson

TechIndy's curriculum will be aligned with Indiana Academic Standards as published by the Indiana Department of Education (IDOE) – the previous section showed the exit standards and how they are aligned with the IDOE standards and any additional standards that will be used. Table 7 shows the key elements of the school curriculum at each grade level and how they will be sourced or developed by the school.

The International Baccalaureate courses and the PLTW courses - which come with a syllabus and prescribed textbooks and other learner material - are IDOE-approved courses and are described in Appendix 4A. Online and face-to-face training is available from both organizations on their curriculum, and required for the school to be an authorized provider of their courses.

The school's Academic Dean and the four lead teachers, who are projected to be hired in the beginning of June, will develop the first year's foundational and Grade 9 and 10 courses, such as English 9 and Algebra 1, basing it on materials from Pearson and supplementing it with online self-contained courses from Apex Learning. The curriculum will be refined by the full teaching staff as they join the school in July and further refined and expanded during the school year. The instructional leadership in the school will ensure that the school's pedagogical model is utilized in the unit and lesson planning process.

The Academic Dean and the lead teachers will also be trained in project-based learning and inter-disciplinary learning through courses at High Tech High and Summit Public Schools in June/July 2017, and will develop the interdisciplinary project-based learning units. These units will also require the collaborative involvement of the full staff to be trained by the Dean and the lead teachers. The inter-disciplinary units will be developed for the first term of school during the pre-school opening planning session in July 2017. Subsequent units will be developed during the school-wide Wednesday collaborative planning sessions during the school term.

The Seminar and Capstone on Global Issues will be required in year 2 of operation, and will be developed by the school staff over the duration of the first year and the subsequent summer. Resources that will be used for the development of this course include: *Empowering Global Citizens: A World Course (Reimers, 2016);* and materials from The Asia Society and UNESCO. An outline of the Seminar and Capstone is provided in Appendix 4B.

Sample lesson plans are provided in the Appendix 5. The integration of the Arts and Humanities is shown in the sample lesson plans – for example, the unit on virus-borne disease incorporates public health issues, public messaging and drama; the unit on bridge design integrates the aesthetics and architecture of bridge design, the cultural variance in bridge design, as well as the social impact of bridges. These units also go beyond the Indiana state standards in the content knowledge – for example the unit on viruses involves an extensive examination of virus DNA structure and propagation both through the individual human body and through populations. This content is beyond that called out in Biology 1 in the Indiana standards.

Tables 8 and 9 show the course plan for a typical student entering the school at grade level, and for a typical student entering below grade level, respectively.

Students who enter below grade level will take foundational ELA and Math courses, complemented with intensive support, tutoring and personalized online learning time so that they can meet grade-level requirements in English and Math in the first year. They will take a lower for-credit course load in the first year but will take the inter-disciplinary project and a PLTW foundation course, which we believe will serve to engage them in learning. By the second year, they will undertake a full credit course-load and graduate with at least 40 credits.

Grades 9-10		**Grades 11-12**	
Foundational learning in ELA and Math	Developed by school staff and supplemented with adaptive learning technology from Dreambox and/or Rennaisance Learning.	IB courses	Syllabus, recommended texts and external assessments provided by IB. Teachers develop formative and internal assessments. Supplemented with online courses from Pamoja
IDOE aligned courses	Teacher developed using Pearson and ck-12 materials. Supplemented with online materials from Apex Learning.	PLTW courses	Syllabus, teaching and learning materials and assessments provided by PLTW.
Inter-disciplinary projects	Developed by school staff trained by High Tech High and/or Summit.	Inter-disciplinary projects	Developed by school staff trained by High Tech High and/or Summit.
Community Service	Developed and implemented with organizations such as Pro-Act and YPII	Seminar and capstone on global issues	Developed by school staff trained by Asia Society or Harvard GSE.
Advisory	Curriculum and training by Engaging school, supplemented with materials from Yale RULER	Advisory	Curriculum and training by Engaging school, supplemented with materials from Yale RULER

Table 7. The school curriculum and resources for sourcing/development

	Cr	Grade 9	Cr	Grade 10	Cr	Grade 11	Cr	Grade 12	Cr	
Language Arts	8	English 9	2	English 10	2	IB Lang & Lit (Higher level)	2	IB Lang & Lit (Higher level)	2	8
Math	6	Algebra I or II	2	Algebra II or Geometry	2	Geometry or IB Math (SL)	1	Geometry or IB Math (SL)	1	6
Science • Biology I • Chem or Physics I • Any Core40 Science	6	Biology I	2	Chemistry I or Physics I	2	One IB Science (SL)	1	One IB Science (SL)	1	6
Interdisciplinary proj.		IDP 1	-	IDP 2	-	IDP 3	-	IDP 4	-	
Social Studies • US History 2 • US government 1 • Economics 1 • World studies 2	6	US History	2	US Gov.	1	Economics 1 Global Issues	1 1	Global Issues	1	6
Directed electives • World Languages • Fine Arts • Career/Tech ed.	5	World Lang. Fine Arts Comm. Svc	1 1 ½	World Lang. Fine Arts Comm. Svc	1 1 ½	Fine Arts IB CP Core	1 2	Fine Arts IB CP Core	1 2	11
Physical Education	2	Phys Ed	½	Phys Ed	½	Phys Ed	½	Phys Ed	½	2
Health & Wellness	1	H&W Ed	1							1
Electives	6	PLTW intro.	-	PLTW course	2	PLTW Course	2	PLTW Capstone	2	6
Total credits	**40**		**12**		**12**		**11 ½**		**10 ½**	**46**
Additional Coursework for Honors										
Math						IB Math (HL)	1	IB Math (HL)	1	2
World Language						World Language *	-	World Language *	-	-
Electives						Additional course	1	Additional course	1	2
			12		**12**		**13 ½**		**12 ½**	**50**

Table 8 Course plan for typical student entering at grade level

Students who choose not to take PLTW will not take the IB CP Core and will take additional IB Science or Humanities courses to make up the credits. These students will not get a IB Career Certificate but will be able to get an IB certificate showing the IB courses they take. * IB CP Core

Indiana Core 40		Grade 9		Grade 10		Grade 11		Grades 12		
	Cr		**Cr**		**Cr**		**Cr**	**IB-CP**	**Cr**	
English/Language Arts	8	ELA Foundations English 9	- 2	English 10	2	ELA Elective	2	IB Lit & Perf.	2	8
Math	6	Math Foundations	-	Algebra I	2	Algebra II or Geometry	2	IB Math Studies	2	6
Science • Biology I • Chem or Physics I • Any Core40 Science	6	(See electives)		Biology I	2	Chem or Physics I	2	One IB Science SL	2	6
Interdisciplinary project		IDP 1	-	IDP 2	-	IDP 3	-	IDP 4	-	
Social Studies • US History - 2 • US Government - 1 • Economics - 1 • World studies - 2	6	US History	1	US History US Govt	1 1	Economics Seminar on Global Issues	1 1	Capstone on Global Issues	1	6
Directed electives • World Languages • Fine Arts • Career/Tech ed.	5	Fine Arts Comm. Svc	1 ½	Fine Arts Comm. Svc	1 ½	Fine Arts IB CP Core	1 2	Fine Arts IB CP Core	1 2	9
Physical Education	2	Phys Ed	½	Phys Ed	½	Phys Ed	½	Phys Ed	½	2
Health & Wellness	1	H&W	1							1
Electives	6	Life Science PLTW intro	1 -	Physical Science	1	PLTW course	2	PLTW course	2	6
Total credits	**40**		**7**		**11**		**13 ½**		**12 ½**	**44**

Table 9. Typical course plan for student entering below grade level in ELA/Math

D. Assessment

The school will use a combination of diagnostic, formative and summative assess throughout the duration of each course, to inform teachers about student learning, to ident strengths and weaknesses in their instruction, and to enable teachers to both differentia modify their instruction to help students learn. Table 10 shows the assessments that v used at the school for the various parts of the curriculum.

Assessment	Type	Audience	Grade 9	Grade 10	Grade 11	Gra
WIDA ACCESS	Diagnostic	Staff, Students, Parents, OEI, IDOE	ELL	ELL	ELL	
NWEA MAP	Diagnostic, Formative	Staff, Students, Parents, OEI	English, Math, Science	English, Math	English, Math	
ISTEP+	Accountability	Staff, Students, Parents, OEI, IDOE	n/a	English, Math, Science	n/a	n
PLTW ECA	Summative	Staff, Students, Parents, OEI	PLTW course	PLTW course	PLTW course	PL cap
School-designed "mock" exam	Pre-final status check	Staff, Students, Parents	n/a	n/a	All IB courses	
IB Assessment	Summative	Staff, Students, Parents, OEI, IDOE	n/a	n/a		Al Cou
School-based	Formative and Summative	Staff, Students, Parents	All subjects assessed to Indiana Academ Standards (end of unit, end of term)			
School-based	Formative and Summative	Staff, Students, Parents	n/a		Global Issues Co	
VIA Character Strengths Survey	Formative	Staff, Students, Parents	Character strengths			
Social Skills Inventory	Formative	Staff, Students, Parents	Social skills			

Table 10. Assessment strategy for TechIndy

In Grades 9-10, the school will put in place a strong formative and summative asse strategy for all subjects including assignments, project reports, essays, and presentations. of subject and inter-disciplinary teachers will collaboratively create the assessment a criteria established during the development of the course, and will use common asses across classrooms. Rubrics will be developed with student input, and teacher collaboratively calibrate grading practices by grading and discussing a sampling of asses from each other's classes. Formative assessments will also include an element o assessment, which has been shown to enhance student understanding of how they are as (Berger, 2014).

ISTEP+, or the requisite state testing, will be administered at the end of Grade 10 for state accountability purposes. For diagnostic and formative purposes, the NWEA MAP assessments will provide data for ELA and Math learning at Grades 9-11 and for Science learning at Grade 9.

The IB courses at Grades 11-12 have a pre-defined assessment strategy consisting of a combination of internal assessments conducted by the school's teachers, and external assessments prepared by the IB and administered internationally at all IB schools. These external assessments are graded using IB trained and certified examiners who are teachers in IB-authorized schools around the country, and the in-school assessments are moderated using a random sample by IB-certified examiners. A review of the IB briefs provided in Appendix 4 will provide more information on the assessment strategy used by the IB.

The PLTW courses at Grades 9-12 are assessed using End-of-Course Assessments provided by PLTW, also providing an objective assessment of students' performance.

The school will use public presentations and student-led conferences to display the creative output of the inter-disciplinary and capstone projects and will engage community members and professionals in evaluating summative student project work. For the Global Issues course, the school will utilize school-developed assessments that align to the standards set by the Asia Society and the Council for Chief State School Officers, and will attempt to develop a collaborative group with other schools using these standards to develop a benchmarked assessment.

In the area of Social Emotional skills and Character development, the school will use the VIA Character Strengths survey and the Social Skills Inventory for formative purposes only and to inform the Advisory sessions. An additional instrument will be identified for assessing the emotional domain.

Using Data to Improve Instruction

The school will use the Data-Wise framework developed at Harvard, and shown in Figure 6, to review and understand student learning and identify areas that need to be addressed.

Using this process, teacher teams will meet every Wednesday to collaboratively analyze assessment data, identify concepts and knowledge that need to be strengthened, identify particular students' challenges, and work together to develop alternate teaching and learning strategies, as well as differentiated practice. Teacher teams will then visit each other's classrooms to coach each other in implementing these strategies. The Executive Director, the Academic Dean and the Lead Teachers – comprising the school's instructional leadership team – will lead this effort and monitor student performance.

The school leadership and the Board will also review assessment data on a disaggregated basis to identify achievement gaps by race, free-and-reduced lunch eligibility, gender, special needs, and ELL. Appropriate strategies will be developed and implemented to address and minimize any gaps through additional supports to students in their learning.

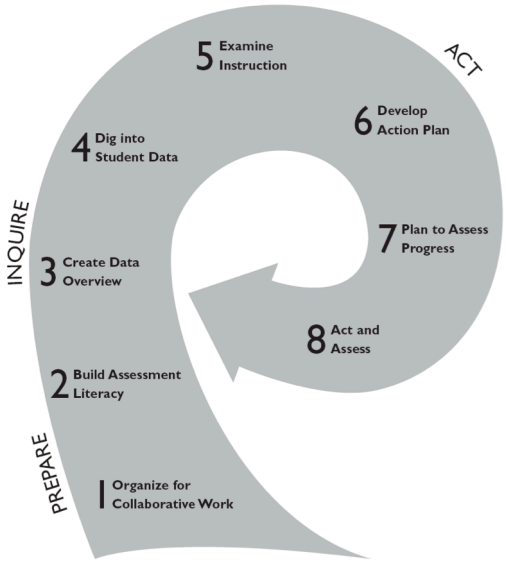


Figure 6: Data-Wise process (source: http://isites.harvard.edu/icb)

Reporting

A student performance report will provide qualitative and quantitative feedback on both academic and social-emotional learning and will be issued to parents twice a semester. Grade-books will also be available for on-line viewing by parents and students on a real-time basis.

Assessment data will be reported as follows on an aggregated basis and dis-aggregated by grade-level, race, free-and-reduced lunch eligibility, gender, special needs, and ELL:

- MAP data will be reported to the Office of Education Innovation (OEI) and the school community in accordance with the Master Calendar of Reporting Requirements
- Attendance, behavior, SEL/Character development and Summative assessment data will be reported to the school community every semester and OEI in accordance with the Master Calendar of Reporting Requirements
- WIDA, ISTEP+, IB final performance, PLTW ECA performance, graduation rates, will be reported to OEI, IDOE and the school community on an annual basis

E. Support for Learning

The culture the school aims to develop and the strategies to develop a positive culture are described in Section II.A.3 and the school's approach to discipline is described in Section II.A.7.

School Plans to develop and maintain family-school partnerships

Research has shown that when families are engaged with their children's' learning, students get better grades, enroll in higher-level programs, display more positive attitudes towards school, make better transitions and are less likely to drop out (Henderson and Mapp, 2002). Thus, engaging families in schools is a key element for a school's success; one of TechIndy's core values is that of *Community,* which comprises developing a community where all stakeholders care for students success and for each other, trust each other and are engaged and actively involve in the school.

At Tech-Indy, we will endeavor to develop the characteristics of what Henderson et al (2007) call a "partnership school" where school leadership will focus on: building relationships between families and staff, developing activities with families that are tied to student learning, embracing diversity, and involving parents in school decisions. The following strategies will be used:

1. At the beginning of each term, the school will organize parent-teacher circles to discuss parents' needs and their students' needs and performance, and developing ways by which they will jointly address these needs.

2. Advisors will conduct home visits to each new family followed by regular home visits at least once a year to their advisees' families

3. Teachers will conduct positive phone calls once a month by teachers to their students' parents, ensuring that these calls celebrate achievements and strengths, not just challenges.

4. Teachers and school leaders will actively identifying family members' strengths or "funds of knowledge" (Moll et al, 1992), using these strengths in classrooms and other school activities, and honoring these and other contributions

5. The school will organize three-way student-led teacher-parent conferences twice a term where students discuss how they are doing in school. These are different from (1) in that the conference will be student-led, and will involve a presentation and discussion of student work, achievements and challenges. The parent-teacher circles will be more focused on relationship building and on identifying particular family and environmental challenges.

6. The school will work with community groups to have translators available when parents need to communicate to teachers and other activities.

7. The school will organize events that celebrate the cultures and languages that make up the school's community

8. The school will organize workshops on topics that families identify to support their children's learning

9. The school will ensure different cultural and ethnic groups are adequately represented on the school site council and that all parents have a voice in the school's policies and operations

10. The school will pro-actively create opportunities for families to visit classrooms and for parents to volunteer in classrooms and other school opportunities.

11. The school will host a family center, which will have computers, reading material, classes for parents, and community services for family use. This will involve partnering with community organizations, social services and seeking grant funding.

12. The school site council will appoint a family and community engagement action team (FCEAT) that will coordinate with the school on these and other family engagement activities.

One of the school's non-academic goals is to ensure stakeholder satisfaction, which will be done with a School Climate Survey for Families, as provided in Appendix 7, administered once a term by the family and community engagement action team (FCEAT). The results of the survey, along with any corrective actions needed, will be disseminated by the FCEAT to the entire school community through the school newsletter, posted in the school at the entrance, and provided to the Board of Trustees of Tech-Indy and the Office of Education Innovation. The Board will provide active oversight to ensure high levels of parent satisfaction.

F. Special Student Populations

1. Students with disabilities

The percentage of special needs students currently enrolled in high schools in the near West side is about 20% (Table 1). In keeping with IDEA 2004, TechIndy will adopt an inclusive approach to the education of students with disabilities, providing access to the general education curriculum in the least restrictive environment, following the principle of "minimizing the negative impact of disability and maximizing the opportunity ... to participate in schooling and the community" (Hehir and Katzman, p. 44). Accommodations will be made in the general education curriculum to accommodate students with special needs, and every effort will be made in classrooms to provide multiple forms of representation, engagement and expression – using the principles of Universal Design for Learning – so that students with different needs are able to access the curriculum. Specifically, the school will:

1. Hire a special education coordinator to coordinate the school's obligations and responsibilities towards students with disabilities.
2. Contract out for special education support, including resources for speech and language therapists, occupational therapists, psychologists, social workers, and counselors on an as-needed basis. We will outsource these services from Easter Seals – a letter of support is provided in the Appendix.

3. Provide training and professional development for all teachers in identifying and supporting the needs of students with disabilities, including the development of accommodations and modifications as needed. All teachers will be required to take at least one special education professional development course in the first year and will receive on-going training through on-site professional development.
4. Provide a Special Services Resource room for special services that cannot be provided in the general education classroom.
5. The school will identify children with special needs, develop plans for their education, and monitor their progress as follows:
    a. Request students and parents to declare any known disabilities after accepting admission, and reviewing any existing IEP and Section 504 plans before the student starts school.
    b. Hold an initial conference with the student, the special education coordinator, parents/guardians, lead teachers and the principal or principal's designee to ensure the student's needs have been recognized and a commitment to developing a support plan is in place.
    c. Implement a tiered Response to Intervention (RTI) model for behavior and emotional needs, reading and math. This system will utilize universal screening in these four areas, which will help identify students with specific needs.
    d. Train the general education teachers to recognize the special needs of students, appropriate interventions at Tier 2 for the school's RTI system, the process for referral for evaluation at Tier 3 (per 34 CFR 300.320- 300.324) to be followed, and the process of ongoing monitoring and reporting against the special education plan.
    e. The special education coordinator will interface with the special services contractor to ensure appropriate services are delivered, with the general education teachers and the students and their parents to monitor the progress and effectiveness of the student.
    f. The special education coordinator and the School Leadership Team will review the progress of all students with Tier 2 and Tier 3 interventions on a monthly basis, and make adjustments to the plans based on progress and in conjunction with the student, their parents and their teachers.
    g. The special education coordinator will ensure compliance with state and federal law, and with identification and reporting requirements under these laws.

2. Students who are English Language Learners/Limited English Proficiency (ELL)

The percentage of ELL students in high schools in the near West side is about 4% (Table 1), which is a small percentage. Students who indicate a home language other than English will be screened using the WIDA Access assessment, supplemented with the Home Language Survey (HLS). The school will follow the Indiana DOE issued guidelines in the *2015-16 English Learner Guidebook* to address the needs of these students. When a student is identified by the WIDA and HLS as an ELL, the school will develop an Individual Learning Plan (ILP) for each ELL student that will define the measures the school will

implement to develop English language proficiency and support the student in accessing age-appropriate curriculum. ILPs will typically include a combination of dedicated language development sessions and mainstream class adaptations where content teachers will support instruction in English using visual aids, materials in the student's first language where possible, graphics organizers, reading partners, peer buddies and other ways to communicate with the learner, as well as accommodations and modifications to be used in the classroom and in assessments. All content teachers will focus on developing oral language skills, vocabulary instruction, and academic language with these learners. The school will ensure at least one English teacher in the school has an ESL certification to support the other teachers and the school will provide training to all teachers to ensure they understand how to develop and implement strategies to work with ELLs in their classrooms.

3. Students who enter below grade level

All incoming students will sit for the NWEA MAP assessment as a diagnostic that will enable the school to identify whether students are below grade-level. The school will also utilize the students' ISTEP assessment performance and the previous school's report card as part of the overall diagnostic assessment. Teachers will then work with each student to develop a Personalized Learning Plan (PLP), which provide for more time on the student's schedule in the areas where they need more support. This support will be provided in various ways: personalized learning using educational technology platforms with adaptive content such as Accelerated Reader and Accelerated Math; intensive tutoring in small groups; individual direct instruction with teachers; and differentiated instruction strategies in class. Students entering below grade level will not take the regular course load until they have achieved grade-level performance in the areas they need support in; instead they will receive additional time on their schedule for individual and group learning and tutoring, particularly in ELA and Math. The Dean of Students will coordinate the school's efforts to address the needs and progress of students below grade-level, and the School Leadership Team will review these students' progress on a monthly basis to determine the resources to be allocated for these students.

4. Students who are academically advanced

The school will utilize Personalized Learning Plans (PLPs) for all students and students will progress with coursework based on their respective PLP, rather than with their grade-group as in traditional schools. Thus, students who are academically advanced will take courses at their level of proficiency. When taking IB courses, students who are academically advanced will be able to take the Higher Level versions of the courses if they desire and work towards a Core40 Diploma with Honors.

In addition, academically advanced students will be able to access a variety of IB Diploma courses using Pamoja Education's online course offerings. TechIndy will also explore the option of students taking advanced coursework at IvyTech and IUPUI during their junior and senior years at the school. IUPUI has indicated our students should be able to take courses at their campus under their Special Programs for Academic Nurturing (SPAN) program. They also advise that students eligible for Free and Reduced Lunch may be able to take up to 6 credits without paying a fee to IUPUI.

III. Organizational Viability and Effectiveness

A. Enrollment / Demand

Demand surveys were done by door-to-door visits, by interviews with visitors to the Fiesta festival held by La Plaza, and at the Mid-Town Educational Summit. The results are shown in Table 11 below. It can be seen that the majority of respondents were very positive about TechIndy's proposed school model and indicated they would select the school as described.

	% respondents		
Do you feel there is a need for a new high-quality high school in your neighborhood?	High need: **52%**	Some need: **36%**	No need: **4%**
What is your impression of the proposed high school focusing on creativity/science and engineering, global competence, youth leadership?	Very favorable: **96%**	Somewhat favorable: **4%**	Not favorable:
Would you or your child select the school that has been described	Definitely: **88%**	Maybe: **12%**	No:

Table 11 Results of survey regarding TechIndy's proposed school model

In Section IB, we showed the need for a high-quality school in the near-West using demographic data and using the current performance of high schools in the neighborhood. The enrollment plan for the school is shown in Table 12 below. The school intends to be a small, high-performing school with a total enrollment of 400-480 students, with 100-120 students at each grade. We will start with a projected combined 200 students at Grades 9 and 10 in Fall 2017, and increase by one grade each year. It is expected that, in the first year, most of the 200 students will be in Grade 9 with a small number in Grade 10. In subsequent years, the intake will be balanced to 100-120 students per grade. The small size will enable the development of a strong culture of high-achievement and a caring community and enable the school to provide personal attention to all its students.

Year of Charter	School Year	Grade Levels	Maximum Student Enrollment
First Year	2017	9,10	200
Second Year	2018	9,10,11	300
Third Year	2019	9,10,11,12	400
Fourth Year	2020	9,10,11,12	420
Fifth Year	2021	9,10,11,12	440
Sixth Year	2022	9,10,11,12	460
Seventh Year	2023	9,10,11,12	480
Maximum			480

Table 12 Enrollment plan for TechIndy

The following recruiting efforts will be made, particularly in the census tracts in the near West-side, Riverside and North-West side.

1. Open houses and presentations will be held at community centers and churches in the community with the aid of community-based organizations. These include Hawthorn

Community Center, Holy Family Shelter, St. Anthony's Church, Christamore House, Haughville Library, and the Haughville and Stringville Neighborhood Associations, among others.
2. Potential parents will be contacted through direct mail and phone contact.
3. Information tables will be held at the major shopping malls in the neighborhood
4. Middle schools in the neighborhood will be requested to give us an opportunity to make presentations to their parents, particularly those of graduating students.
5. An internet presence will be established through a website and a Facebook page
6. A free summer camp on Android App development and Robotics will be offered if a small grant can be obtained and if IPS will provide the school facilities for this use

In addition, the school will utilize the services of Enroll Indy to market itself and seek enrollment for the school.

As the school will be a public school, it will have an open enrollment process, and will have a February cutoff date for early acceptance. Students who enroll at the early acceptance dates will be able to participate in the free Robotics/Android summer camp mentioned earlier. Students who apply later will be accepted on a space available basis, and if the school is over-subscribed, students will be admitted on a lottery basis.

B. Human Capital

1. Qualifications and attributes of an ideal teacher for TechIndy

The ideal teacher for the proposed school will have the following attributes: a commitment to the success of all students; a deep caring for each student's unique needs; an understanding of how adolescents learn and develop; a respect for, and curiosity of, all cultures; a collegial and collaborative approach to teaching and an acceptance of open classrooms; and a growth mindset of learning to continuously improve teaching and learning in the school. In addition, the ideal teacher should show aptitude for inquiry-based and project-based learning, which are the core pedagogies to be used at TechIndy. All teachers will be required to have at least an initial teacher's license with the IDOE and will be expected to maintain their license in good standing.

2. Recruitment and Selection procedures

Recruitment will be done through partnerships with The New Teacher Project, Teach For America, Troops to Teachers, as well as through traditional channels. The following job-sites – listed on several websites (teach.com, certificationmap.com) as among the 10 best for teaching jobs - will be utilized as will newspaper advertising and use of recruiters:

- Teach.org
- Educationcrossing.com
- k12jobspot.com
- teachers-teachers.com
- schoolspring.com
- teachingjobs.com
- naset.com (National Association of Special Education Teachers)
- careerbuilder.com

The selection process will involve the school leadership (Executive Director, Dean of

Academics and Dean of Students) and the teacher leaders evaluating the candidates on their value alignment with the school's mission, as well as their strengths in content knowledge, pedagogical knowledge and pedagogical content knowledge. Teachers will also be involved in the selection process once the school has started operations, and eventually, the school will work towards including students and parents as well in selection of new teachers.

- Behavioral interviewing and pedagogical situational interviewing will be used to determine candidates' skills and predispositions in the desired attributes.
- Candidates who are not familiar with inter-disciplinary project-based learning will be given a short introduction to the concept, and then will be immersed in a collaborative planning situation with the teacher leaders, carefully scaffolded to assess their ability to contribute in a collaborative planning activity, and to engage with project-based learning.
- Candidates will be asked to conduct a demonstration lesson, which will enable lead teachers to assess their classroom management, behavioral management and pedagogical skills, as well as their ability to relate to students and create a strong classroom culture reflecting the school values. Before TechIndy opens, we will partner with another charter school to facilitate these demonstration lessons.
- Candidates will be asked to take the VIA character assessment survey, as well as the Global Perspectives Inventory from Iowa State University (http://www.gpi.hs.iastate.edu) to determine their cultural competence and global awareness.

3. Developing an effective professional development program for TechIndy

The school will develop a strong professional development program that will consist of training in the following:

- project-based learning, inquiry-based learning, personalized learning pedagogies
- standards and development of global competence
- development of social-emotional skills and character throughout the school program and the use of behavioral management and restorative practices
- inclusive education for students with special needs and working with ELLs

The core teaching team (Academic Dean, Teacher Leaders) will be trained in project-based learning through workshops at High Tech High Graduate School of Education, and in inquiry-based learning through distance learning and residences with the Harvard Graduate School of Education, and personalized learning through residences at Summit Public Schools or Boston Day & Evening Academy. The core team will develop in-school workshops to disseminate the practices they have learnt, and will support the other members of the teaching team through ongoing coaching and collaborative planning, teacher rounds and reflection. In year 3, the school will apply to be a candidate school for the IB and teachers will take the required IB workshops and online courses to enable them to teach the IB curriculum.

The engineering teachers at TechIndy will be required to obtain a four-course sequence in K-12 engineering education with Tufts University over their first year of teaching, and will also take the relevant PLTW core training needed to deliver the PLTW courses.

Global competence training will be provided in conjunction with The Asia Society. Social-

emotional skills training will be provided through advisory training by Engaging Schools of Cambridge MA, and restorative practice training will be provided by the Peace Learning Center based in Indianapolis. Special education and ELL training will be done before the school opens and on an on-going basis through the school year to ensure teachers meet the needs of these special student populations.

4. Staff Evaluation System

The staff evaluation system will be based on the Indiana RISE model, which has two components: a student learning component and a professional practice component. The professional practice component has four domains consisting of Planning, Instruction, Leadership, and Professionalism. However, the Instruction domain in RISE will be modified to include elements of the subdomains from the Boston Public Schools' framework [12]shown in Figure 7.

From BPS Standard 1: Curriculum, Planning and Assessment

B. Assessment Indicator
1. Variety of Assessment methods
2. Adjustment to practice

C. Analysis Indicator
1. Developing analysis and conclusions
2. Sharing conclusions with colleagues
3. Sharing conclusions with students

From BPS Standard II: Teaching All Students

A. Instruction Indicator
1. Quality of effort and work
2. Student engagement
3. Meeting diverse needs

B. Learning environment indicator
1. Safe learning environment
2. Collaborative learning environment
3. Student motivation

C. Cultural Proficiency Indicator
1. Respects differences
2. Maintains respectful environment

Figure 7 Elements of BPS' evaluation framework to be included by TechIndy

We will also modify and extend the Planning and Instruction domains to include aspects important to TechIndy's academic and pedagogical model such as inter-disciplinary learning, social-emotional/character development and use of restorative practices.

The TechIndy framework will be fully developed collaboratively by the school leadership and teacher leaders, and submitted to the Board for approval, before the school opens in 2017.

5. Compensation Structure

TechIndy's salary scale will be aligned with that of Indianapolis Public Schools – the IPS salary scale is shown in Appendix 8. Full-time staff will receive a health/dental insurance allowance up to $400 per month, and will receive a 403(b) matching contribution of 2.5% of their salary after their first year of service.

TechIndy will also implement a pay-for-performance scheme and a career ladder as follows:

[12] http://www.bostonpublicschools.org/Page/416

1. Performance bonuses and annual pay raises based on the evaluations. The amounts of these will depend on the financial health of the organization.
2. A career ladder that comprises five steps where teachers can advance in responsibility and pay, while continuing to teach. These steps are: Teacher Associate, Teacher, Senior Teacher, Master Teacher, and Teacher Leader.

Indicate the number of teachers and other school staff to be hired. If necessary, describe the job position.

Table 13 shows the number of staff to be hired at Tech-Indy for different levels of enrollment. It is expected that school leadership will carry a teaching load – higher at the beginning, and lower as the number of students approaches 400. Brief job descriptions for some of the positions are as follows:

- The Dean of Academics (DoA) will work closely with the Executive Director and the Teacher Leaders on curriculum development, teacher supervision and evaluation, and on development of the pedagogical model in the school.
- The Dean of Students (DoS) will be responsible for the school culture, advisory program, restorative practices and positive behavioral supports, needs of special student populations, guidance and career counseling, and will take the lead on the youth leadership domain of the school model.
- Teacher leaders will be senior teachers who have exhibited the potential or have the experience to lead the school in its pedagogical model and in curriculum development.
- The Business Manager will manage the finances, school facilities and transportation and will also serve as the school secretary until the enrollment allows hiring of a secretary.

	Year 1 200 students	**Year 3 (full enrollment) 400 students**
Executive Director	1.0	1.0
AP/Dean of Academics	1.0	1.0
Dean of Students	1.0	1.0
Teacher Leaders (ELA, Math, Science, Humanities)	4.0	4.0
ELA teachers	1.0	3.0
Humanities teachers	1.0	3.0
Engineering teachers (Note 1)	1.0	2.0
TNTP teachers (Math & Science)	2.0	3.0
Maths & Science teachers		3.0
Fine Arts teachers	0.66 x 2	3.0
Language teachers	0.4 x 2	2.0
Spec. Ed Coordinator	1.0	1.0
Guidance counselor	1.0	1.0
School Nurse	0.5	0.5
School Secretary	-	1.0
Business Manager	1.0	1.0
Sports Coaches	0.4	0.8
IT technician	0.5	0.5
Careers Counselor	0.5	1.0

Table 13 Projected Staffing at different levels of enrolment

Other notes to the table:

1. Fine Arts – the school will offer Visual Art, Theatre/Film and Choral/Instrumental music using part-time teachers with a limited offering in the beginning and growing to a full offering at higher enrollment levels.
2. World Languages offered will be Spanish and one other language that will be identified in consultation with the school community, and will be offered initially by part-time teachers.
3. Sports coaches will be hired only for the hours needed.

6. Staffing Special Education

The school will have a Special Education Coordinator who will coordinate the school's response to the needs of students with IEPs and 504s, and will coordinate the activities of the external provider to respond to students' needs. The Special Education Coordinator will be an Indiana-licensed for exceptional learners – ideally for intense interventions – and will have at least three years' experience developing and managing IEPs and 504s, implementing state requirements for reporting and documentation, implementing case conferences, and conducting interventions for special needs such as autism and learning disabilities. TechIndy has identified Easter Seals as a provider of special needs services and they are able to provide physical, occupational and speech therapy as well as psychological and behavioral supports, and will work with this organization to provide the needed resources.

An important element for addressing the needs of special education students is that classroom teachers should be adequately equipped with the skills to identify and provide accommodations and first-line interventions in an RTI model in the classroom for learning and behavioral disabilities, as well as being able to make accommodations for students with physical disabilities. To achieve this, the school will encourage teachers to get a dual-license in their content area and exceptional learners, through an increase in pay. The school will also hold regular professional development sessions on special needs throughout the school year. School leadership, the Special Education Coordinator, and Teacher Leaders will watch for over-identification of minority students as students with disabilities or as students with behavior disorders and will take corrective action as necessary.

C. Governance and Management

1. Organization Structure

The organization structure of the proposed school is shown in Figure 8, and the Articles of Incorporation, the By-laws and the application for 501(c)(3) status are attached in Appendix 12. The Board of Directors will have oversight and accountability over the school, which will be led by the Executive Director/Founder. The School Site Council, consisting of a group of parents, teachers and students will serve as an advisory council for the Executive Director and will also provide a way for school stakeholders to have voice into the school policies and operations. The Executive Director will have three senior direct reports: a Dean of Academics/IB Coordinator, a Dean of Students, and a Business Manager. Teacher Leaders will lead each department and will report to the Dean Of Academics.

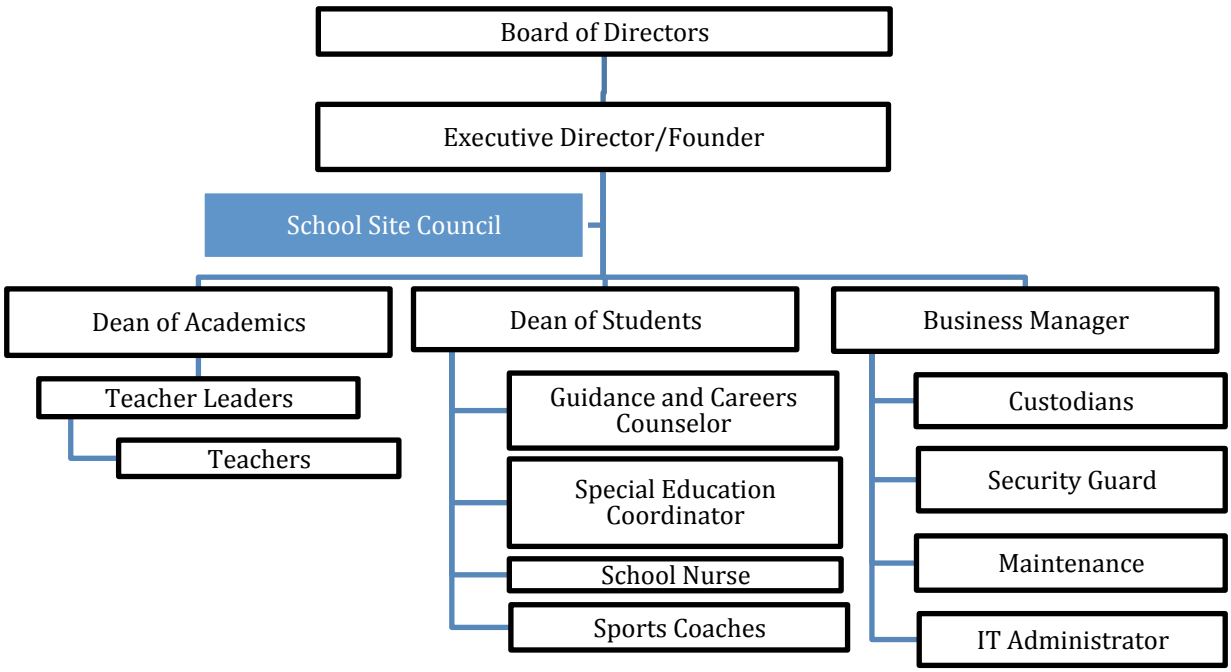


Figure 8 School Organization structure

2. Roles and Responsibilities

The roles of the various positions are described below.

a. Board Chair

The Board Chair is the senior volunteer of the organization and presides at all meetings of the Board. The Chair ensures development of the Board capacity, and oversees implementation of Board and organizational policies and ensures that appropriate administrative practices are established and maintained.

b. Secretary

The Secretary is an officer of the organization and provides direction for the keeping of legal documents including minutes of all meetings of the Board, as well as all incorporation papers and legal notices.

c. Treasurer

The Treasurer is an officer of the organization and provides direction for the financial management of the organization and helps the Board to meet its financial oversight responsibilities. S/he oversees the development of the annual budget, financial policies, risk management of the organization, and appointment of the auditors.

d. Board members

Individual Board members actively function as stewards of public trust, complementing the three officers (Chair, Secretary and Treasurer) in the work of the Board, which is to provide oversight

over the organization's performance and development and implementation of policies and procedures that govern the fiscal and academic operations.

e. Board Committees

Four Board committees will assist in the work of the Board, with a Board member chairing each committee: Fund Development, Finance, Community Engagement and Academic Committees. Additional members from the community will be recruited to serve on the Committees, serving to supplement the expertise of the Board and to provide a pipeline of new Board members. The Chair is a full member of each Committee and the Executive Director is an ex-officio member of each Committee.

f. Executive Director

The Executive Director serves as the chief executive of the school and is responsible for the success of the school. Together with the Board, the Executive Director ensures the school is faithful to its charter, accomplishes its mission and vision, and is accountable to its stakeholders. The Executive Director is an ex-officio member of the Board, reports to the full Board and is evaluated by the full Board on a periodic basis.

g. School Site Council

The School Site Council serves to provide a voice to the various stakeholders in the operation of the school. It will consist of four parent representatives (one for each grade), four teacher representatives and four students and will represent these three stakeholder groups in providing input on school policies, student needs, budget development and fund-raising. It will also organize parent involvement in school activities.

h. Dean of Academics

The Dean of Academic reports to the Executive Director and coordinates curriculum development, leads IB program implementation, drives academic performance in the school, and coordinates teacher evaluation. S/he works closely with the Executive Director and the teachers in ensuring the school meets its academic performance targets.

i. Dean of Students

The Dean of Students reports to the Executive Director and leads the development of school culture, and coordinates student discipline, support for special student populations, extra-curricular activities, and guidance and counseling for students.

j. Business Manager

The Business Manager reports to the Executive Director and is responsible the financial, facilities, transportation and IT operations of the school.

3. Board processes for Policy development and Decision-making

a. Process for Policy Development

Policies or revisions to existing policies will be initiated either by the Executive Director with his/her staff or by Board Committees. The School Site Council, in conjunction with the Executive Director or his/her designee, will conduct consultations with the three key stakeholder groups to ensure their inputs are taken into account. Subsequently, the policy

will be presented to the appropriate Board Committee for review and consultation with the broader community and other stakeholders as appropriate. The Committee may hire appropriate consultants to assist in the review and development of policies as needed. Once the committee is satisfied with the policy, it will present it to the full Board for ratification.

b. Decision-making

The Board will make decisions primarily through consensus building. When consensus cannot be obtained, a vote will be taken with the Chair casting the tie breaking vote where needed.

4. Role and Responsibilities of the Board in Relation to the School Leader

Table 14 below summarizes the differences in roles and responsibilities between the Board and the school leader.

	Executive Director	Board
Overall role	Responsible for ensuring the school meets its goals, has sound fiscal management, follows Board-approved policies and procedures, and meets its legal obligation	Oversight and overall accountability over the organization's performance and fiscal and fiduciary conduct
Curriculum development	Leads the development of curriculum in alignment with approved programs and models	Reviews to ensure it is aligned with the school's approved education model
Educational program selection & approval	Identification, evaluation and proposal of new programs to the Board	Approval of proposed programs and monitoring of efficacy
Human Resource Policies and procedures	Development of policies, consultation with stakeholders, and proposal to the Board	Review against best practices and approval
Staff recruitment and hiring	Responsible for recruitment and hiring in accordance with approved policies	Oversight to ensure policies are followed for recruitment and hiring
Salary and bonus structure	Development and proposal to Board	Review against best practices and approval
Budget Development	Development and proposal to Board	Review against best practices and approval
Expenditure	Ensure spending is within budget or allowed variance	Regular review of expenditures against budget, and consideration/approval of any proposed or required unbudgeted expenses over allowed variance
Vendor selection	- Soliciting of bids and vendor selection per approved policies - Tendering, short-listing and proposal of selected vendors to Board for amounts over $100,000	- Policies and criteria for vendor selection - Approval for selection of vendors for amounts over $100,000

Table 14 Delineation of responsibilities between the Board and Executive Director

5. Biographies of Board members and Executive Director

The following Board members have been appointed and their detailed resumes are provided in Appendix 13. We expect to hire an additional four Board members: one with a legal background, one with a fund-raising/development background, and one additional member with strong community-level connections. Officers will be appointed at the first official Board meeting to be held in late October.

Chair – Ms. Janet Rummel. Ms. Rummel is currently Director of Training with Phalen Leadership Academies and formerly Executive Director of Goodwill Education Initiatives in Indianapolis, where she has worked for the last four years. Prior to this, she was Vice-President at the Center for College and Career Readiness in Oakbrook Terrace, IL where she served for ten years. Ms. Rummel has also worked at the Indiana Department of Education as Assessment Specialist for a year and in Zionsville Community Schools as teacher, department chair and program administrator for twelve years. She is currently a PhD candidate in Curriculum and Instruction at Purdue University ad holds a Masters of Science in Education with a Building level Administrators license from Indiana University Bloomington.

Ms. Rummel brings a strong educational background to TechIndy's Board as well as strong community-level connections through her tenure at Goodwill. With this background, she will provide oversight for the school's goals in student achievement, and help build community-level support for the school.

Board Member – Ms. Baindu Bayan. Ms. Bayan is a biomedical scientist and is currently a doctoral candidate at IUPUI's Department of Medical and Molecular Genetics, having received the prestigious President's Diversity Dissertation Fellowship. Baindu has served as a mentor for young students pursuing medical science with her ongoing involvement with the Hoosier Health Academy, College Prep Academy, and as a member of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers. She also mentors outside of the science field as a volunteer for initiatives such as the 100 Black Men of Indianapolis' Financial Literacy Program and maintains her connection to the community as a member of the Indianapolis Urban League Exchange.

Ms. Bayan has strong connections to community organizations such as 100 Black Men and Indianapolis Urban League and will help build community-level support for the school. As a minority woman pursuing a PhD, and with extensive publications in her field, she also serves as a strong role model for TechIndy's minority student body.

Board Member – Ms. Lisa Prentiss. Ms. Prentiss is currently Strategic Initiatives Leader and Chief of Staff at Cummins Fuel Systems, having worked at Cummins since 1989. She holds an MBA from the Kelley School of Business at Indiana University and a Bachelor's in Mechanical Engineering from Purdue University.

Ms. Prentiss has strong foundation in the technology/engineering sector, and will bring industry-level support for TechIndy Also as an accomplished woman engineer, she also serves as a strong role model for TechIndy's students.

Board Member – Dr. John McGill. Dr. McGill is the Senior Director for Science and Research Partnerships at Lilly Research Laboratories. During his tenure at Lilly, he has held several high-profile assignments including COO of Fairbanks Institute for Healthy Communities and COO of Lilly China Research Laboratories. He is currently on the Scientific Advisory Board of Indiana Biosciences Research Institute.

Dr. McGill has strong ties to the biomedical scientific and research professional community and is able to make needed corporate connections for TechIndy. With his strong research and practice background, he is also able to advise TechIndy on STEM education and project design for student learning.

Board Member – Mr. Joel Githiri. Mr. Githiri, a Certified Public Accountant, is currently Director of Accounting at Key Benefits Administrators, having previously worked at Grant Thornton as well as Morningstar Inc. In the non-profit sector, Joel has served as Chairman of the Young Professionals Network within the local chapter of the National Association of Black Accountants (NABA) in Chicago, Treasurer of the Urban League Exchange in Indianapolis, and has mentored high-school students through 100 Black Men's financial literacy program.

Mr. Githiri provides the financial oversight element for TechIndy's Board. He also brings strong community-level connections which will help build community support for the school.

Executive Director – Mr. Mahmoud Sayani. Mahmoud Sayani studied Electrical Engineering at Duke University before starting a career in design engineering, project management and marketing in the Boston area. In 2003, he made a career switch to the non-profit sector, with an opportunity to lead a humanitarian relief agency with operations in Central and South Asia. In 2006, pursuing a desire to contribute to the country of his birth, he was appointed CEO of Aga Khan Education Service Kenya (AKESK), a non-profit organization that operates eleven schools in four cities in Kenya. During his tenure, he turned around the financial performance and improved the academic performance of AKESK's schools, and led a school improvement program for 137 public schools under a grant from USAID and CIDA. He subsequently returned to North America, where he worked as an independent consultant for organizations including the International Baccalaureate Organization. Mahmoud's qualifications include an Ed.M. from the Harvard Graduate School of Education, as well as a MBA from Boston University, and a M.Sc. (Electrical Engineering) from Duke.

6. Collective qualifications for establishing a high quality charter school

As seen from the biographies provided in Section II.C.5, the Board brings a collective strength in leadership and management in the non-profit and the for-profit sectors and in connections to the community and the corporate sector in Indianapolis. In addition, two Board members have worked with the Indiana Department of Education, and thus bring a strong knowledge of state and federal education policy and requirements to the school. The Board also has legal and financial oversight expertise, and collectively feels a strong responsibility for strengthening K-12 education in Indianapolis. All Board members are respected members of their communities and in their professional lives and will ensure the organization meets its fiduciary responsibility for public funds.

7. Plans for further recruitment of other key personnel

The Dean of Academics and the Dean of Students are the other two senior leadership positions at the school. The Board will form a sub-committee of two members to assist the Executive Director in the selection of appropriate candidates for these positions. The Board may decide to invest in hiring a recruiter to identify appropriate candidates for these positions, and will ensure that appropriate interviewing procedures and background checks are used during the selection process.

8. Recruitment, selection, and development plans for board members

New Board members will be identified through connections of current Board members, through approaches to community-based organizations, and through the Board sub-committees for whom non-Board members will be recruited both to assist in the work of the Board and as succession planning for the Board. Selection will be done by a sub-committee of the Board appointed at a general meeting and will be done by matching candidates' profiles and interview performance against requirements identified by the Board or the recruitment ad-hoc sub-committee.

Care will be taken to ensure that the Board represents the diversity of Indianapolis and that Board members have close ties to the various communities in the city on an ongoing basis.

Board members will receive an initial training session by BoardonTrack.com. This will be supplemented by training by school staff on the educational model of the school, as well as training on how to look at student data and monitoring student performance. Additional training will be identified and sourced by the officers of the Board as needed.

New Board members will receive an induction to the organization's mission and by-laws, Board procedures, existing school policies and performance metrics, their responsibilities as Board members, and the difference in roles and responsibilities between the Board and the school leadership team. Where possible, effort will be made to ensure a transition/mentoring period by previous Board members for incoming Board members. An induction manual for new Board members will be created over the first year of operation of the Board which will assist in on-boarding newly appointed members. Finally, we will include Board development activities at least three times in the first year of operation, and at least once a year in subsequent years.

D. Community Partnerships

Several organizations have been contacted to obtain support for the school. This includes a variety of organizations that will support the three pillars of the school model and that will provide various other supports needed to make the school successful. Table 15 below shows the organizations, the nature of partnership and whether a letter of support has been obtained. Copies of the Letters of Support are provided in Appendix 9.

Name of Organization	Representative from Organization	Address, phone number and email address	Nature of the partnership with the school	Is a letter of support included in the application?
TNTP	Mr. Scott Syverson	(317)989-9986 scott.syverson@tntp.org	Teacher training, placement and coaching	Yes
Easter Seals	Ms. Sherry Floyd	317.466.1000 x2486 shenry@eastersealscrossroads.org	Delivery of behavior and therapy services for special needs students	Yes
IFF	Mr. Nate Lichti	317-860-6904 nlichti@iff.org	Facilities identification and refurbishment; financing for facilities refurbishment	Yes
Peace Learning	Ms. Kristina Hulvershorn	317.327.7144 kHulvershorn@peacelea	Development and enactment of	Yes

Center		rningcenter.org	disciplinary policy and practices based on restorative practices	
Indianapolis Museum of Art	Dr. Heidi Davis-Soylu	317-923-1331 x283 HDavis-Soylu@imamuseum.org	Development of arts-infused curriculum units	Yes
Youth Philanthropic Initiative of Indiana	Ms. Jill Gordon	317.630.5200, ext. 116 jgordon@inphilanthropy.org	Developing service learning and civic engagement opportunities	Yes
RiverWest	Ms. Martha Henn	317.278.2344 hennm@iupui.edu	Partnership with near-west/River-west communities	Yes
Lilly Foundation & BioCrossroads			Support from biotechnology companies in curriculum development and involvement of professionals in project-based learning at school	Yes
The Asia Society	Ms. Kate Farmer	New York, NY	Global issues curriculum, working with schools globally	Agreement to be developed after charter
Engaging Schools	Ms. Sarah Bialek	Cambridge, MA	Advisory curriculum and behavior support	Agreement to be developed after charter

Table 15 Community partnerships developed

Other organizations that we are in dialog with are shown below.

Hawthorn Community Center	Engaging the community in the near-west side	Dialog started
Holy Family Shelter of Catholic Charities	Engaging the community in the near-west side	Dialog started
La Plaza	Engaging the Latino community to support students in their education	Dialog started
Pro-Act	Service learning and civic engagement programs for TechIndy students	Dialog started
16Tech Zone	Support from biotechnology companies in curriculum development and involvement of professionals in project-based learning at school	Dialog started
Project Lead The Way	Curriculum for bioscience, computer science and engineering	Dialog started
IUPUI and IvyTech	College Credit and accelerated pathways; potential curriculum development	Dialog started
Edna Martin Christian Center	Youth leadership development	Dialog started

Some concrete examples of how community organizations will play a role in the life of the school are:

1. We plan to engage YPII, Pro-Act, and Edna Martin Christian Center to help us develop programming in service learning and civic engagement and to take students out of the school on Wednesday afternoons to engage in these activities.

2. We plan to engage 16Tech, Bio-Crossroads, Cummins Fuel Systems and other corporate and development organizations to help us develop authentic real-world projects, mentor students in the execution of these projects and help assess student performances and work in these projects in public exhibitions of performance.

3. We plan to engage organizations like The Expectations Project and La Plaza to help us understand students' challenges at home, help mobilize resources to assist parents and help deliver workshops for parents to get them engaged in their children's academic lives.

4. We plan to get organizations like the Indianapolis Museum of Art and other arts-based organizations to work with the school's teachers to develop and executive inter-disciplinary projects with arts integration, and to extend student learning in the Arts beyond what is available in the classroom.

E. Financial Management

1. Management of School Finances

The Board of TechIndy will be accountable for the management and use of public funds, and will in turn oversee financial management through the Executive Director. The Board Treasurer and the Finance Committee of the Board will carry out the financial oversight functions, reporting to the Board. The Finance Committee, in conjunction with the Executive Director, will develop comprehensive financial and risk management policies and procedures based on best-practices in the non-profit sector and compliant with GAAP, and will submit these for approval to the full Board.

The school will employ a Business Manager, who will manage the school's day-to-day finance function. The Business Manager will be responsible for ensuring the financial and risk management policies and procedures approved by the Board are followed, for ensuring that the required financial controls are in place, for generating monthly financial statements for School Leadership and Board review, for ensuring that assets are secured, and for ensuring emergency management and disaster recovery procedures are in place and practiced. S/he will report to the Executive Director, who will be accountable to the Board for overall financial management at the school. The school will use small-business financial accounting software such as QuickBooks to maintain financial records, and payroll will be outsourced to a service like Intuit Payroll or ADP.

The Finance Committee of the Board will conduct a quarterly internal audit and submit a report to the Board Treasurer who will review the report with the Executive Director and ensure appropriate corrective actions are taken. The Board Treasurer will also review the school's financials on a monthly basis and issue his/her opinion with recommendations to the Board,

along with the internal audit report. The Board may outsource the internal audit function to a professional accountant if the Finance Committee lacks the capacity to carry out the audits.

The Board will hire an independent certified public accounting firm to conduct an annual audit based on the guidelines applicable to public charter schools. The audit will, at a minimum: test the accuracy of the school's financial statements, examine revenue related data collection and reporting practices and examine the school's internal controls. The audit will be submitted to the Board of Directors for review and approval. Copies of the audit will then be submitted to the Mayor's Office within 90 days of the end of the fiscal year.

2. Financial Management Policies and Controls to be employed at the school

The following financial management policies will be developed and employed at the school:

1. State and Federal Revenues
    a. Permitted uses of different revenue streams e.g Title I, IDEA, etc.
    b. Revenue recording – timing and account categories
    c. Reporting to state and federal agencies
2. Fund-raising, Grants and Donations
    a. Approval of fund-raising for operations and capital development
    b. Conduct of fund-raising activities by school
    c. Acceptance of restricted private donations
    d. Acceptance of gifts in-kind
    e. Issuance of tax-deductible receipts
    f. Use of donations and funds raised through development activities
3. Expenditures
    a. Quotation requirement for purchases
    b. Open-bid and tendering
    c. Purchase approval matrix
    d. Receiving and recording goods and services
    e. Payment approval matrix
    f. Travel expenditure and reimbursement
    g. Professional development reimbursement
4. Asset Management
    a. Receiving, recording, labeling and tracking Furniture, Fixtures and Equipment (FFE) and supplies
    b. Depreciation
    c. Disposal of assets
5. Cash, Bank and Investment Management
    a. Petty cash, usage and approval
    b. Bank account signing matrix
    c. Bank statement reconciliation
    d. Investment policy
6. Staff Compensation and Benefits
7. Budgeting and Variance management
8. Financial Statements
    a. Generation, review and distribution of financial statements
9. Internal and External Audit

10. Risk Assessment and Management
11. Records Management and Security
12. Disaster Recovery

The policies listed above will detail the controls to be employed at the school to ensure that funds are used for targeted purposes, that goods and services are procured at best available prices, and that the assets of the organization are protected. In particular, all purchases and payments will require two signatures and Board Treasurer/Chair approval will be required over a pre-determined amount. All travel and other professional expenses for the Executive Director will be pre-authorized by the Treasurer and Chair, as will all reimbursement to the Executive Director.

The policies will also define how variances to budget will be handled. The Executive Director will review spending and commitments against budget on a weekly basis and will have the authority to approve variances against specific budgeted line items within 10-20% (to be specified by the Board), provided the bottom line is not negatively impacted. In situations where the bottom line is negatively impacted, the Executive Director will notify the Board and provide a plan of action to control the impact.

3. Procedure for developing annual budgets.

The school will develop its annual budget using a participatory process with the involvement of teachers, students, parents and Board members. The process will begin by the school community collectively defining the learning and teaching objectives for the school, and prioritizing the personnel, supplies, equipment and professional development needs for the coming year. A school-level budget committee will then prepare the budget and submit it to the Finance Committee of the Board who will review it for fiscal propriety and for alignment with the Board-approved strategic plan and priorities for the school. The budget will be iterated until the Finance Committee is satisfied and then presented to the Board for approval. Approved budgets will be provided to OEI.

4. Planned fundraising

The school will raise funds for the following purposes:

1. Funds for the exam fees, uniforms, and other educational needs of students who are unable to fund these costs due to low family income. These will be raised from private donors and will be led by the school.
2. Funds for the ongoing enhancement of the school educational program, such as science and engineering curriculum and equipment. This will be done through applying for specialized grants from state/federal agencies and from foundations. The school will lead these efforts.
3. Funding for a family engagement coordinator who will engage and organize families to get better family involvement in the school. The school will lead this effort and will seek funding from foundations in the initial years of operation until it is able to fund the position from regular operating funds.
4. Capital development for facility extensions and enhancements. It is expected that the school facilities will be launched in a phased manner. While the first phase leading to

launch is expected to be financed through a loan arranged by IFF, subsequent expansions and additions will be require a capital campaign. The Board will lead the capital campaign and a dedicated fund-raising professional may be hired to work on this effort.

F. Budget and Financial Matters

The first twelve months cash flow statement and five-year budget are provided in Appendix 11. The first year's budget shows a small deficit of approximately $13,000 while subsequent years show a surplus that will be used to create a reserve and fund facilities refurbishment in year five or six. The first twelve month's cash flow forecast shows need for a revolving line of credit, which will be cleared by the end of the first year.

Revenues

The school is expected to start with 200 students at Grades 9 and 10 in the first year, ramping to 300 in the second year, and 400 in the third year. Per-student funding is expected to be $6,730 per the OEI template. In addition, the following federal funding is estimated.

- Federal lunch reimbursement is estimated for 70% of the students who are expected to qualify. A reimbursement amount of $3.07/student is used based on information from federal websites. This is expected to be a break-even item and a corresponding amount is used in the expense side.
- Title I funds are estimated at $460 per qualifying student, expected at 60% of enrollment.
- IDEA funding for special needs students is estimated at $150 per student for total enrollment as estimated by Afton Partners, a consultant, using comparable schools in IPS.
- Title II funding for professional development is estimated at $15,000 per year
- Textbook fees are estimated at $180 per student for students who do not qualify for reimbursement and $76 for those students for do (70% of enrollment).

The school will need startup funds to fund pre-opening staff hiring and equipment purchases for the school (These are discussed in the expenditures section below). Once our charter application is approved, we will apply for startup grants from the Walton Foundation and The Mind Trust; typical awards for these to comparable startup charter schools is shown below.

- Walton Family Foundation - $325,000
- The Mind Trust $100,000

IFF has indicated it will be able to source financing for facilities refurbishment, which is expected at $30/sq.ft or approximately $360,000. An additional $140,000 has been budgeted for furniture. Financing cost is estimated at 6.375% annual interest.

Finally, a working capital line of credit will be established to help fund the first year operations, which Charter School Capital has indicated it will be able to assist us with. The maximum usage of the line of credit is estimated to be $75,000, which will be cleared off by the end of the first year. The total interest expense is estimated to be $3,000 at a conservative 1% per month rate.

Expenditures

Staffing Staffing assumptions have been shown in Table 12 earlier and salaries have been estimated as shown below using the newly announced salary scale by IPS. The salaries used are comparable to those used by other recently approved charter applications for high schools.

	Average salary
Lead Teachers	$47,000
Engineering teachers	$47,000
TNTP Teachers	$35,000
Other Teachers	$42,000
Spec. Ed Coordinator	$45,000
Guidance counselor	$40,000
Careers Counselor	$43,000

A small number of support personnel have been budgeted for: one Special Ed coordinator, a part-time school nurse, one business manager, a part-time school secretary and a part-time IT administrator (from the second year).

Professional Development. A significant amount of professional development has been budgeted to build the capacity to deliver STEM education, IB curriculum, and strong instructional practice. Of the startup costs, $29,000 has been budgeted for pre-opening training with Summit Public Schools, PLTW core training, training on Social-emotional learning and training on the school's pedagogical model. An additional $26,000 has been budgeted during the first year's operation to build the capacity of teachers in the school's pedagogical model. This is a strategic priority for the school.

Operations costs - are estimated as shown in the budget template.

Rent – has been estimated at $8/sq. ft for 12,000 sq. ft to start with, with an additional 20,000 sq.ft to be added in year 3. This estimate has been based on an estimate from the Central State developer for the buildings available at that site.

Startup and Capital Costs. Estimates have been made for lab equipment, IT equipment and textbooks. It is assumed that all students will have access to a Chrome-book while on school premises – this will be financed from the startup grants. All costs have been estimated using actual list prices on resellers' websites. Laboratory equipment for Project Lead the Way has been estimated based on details provided on PLTW's website.

Escrow. As required, an escrow fund has been budgeted at $10,000 per year for the first three years. This is shown in tab 8 of the spreadsheet.

G. Facility

The following facilities have been identified as potential locations for the school.

1. **Central State campus in the near West-side (160 Steeples Ave).** There are two buildings available (Figure 9) at this location that will need to be refurbished but can serve as the site for TechIndy. There is a field on the campus that can be used by the school through an arrangement with the city, and there is a third building that can be repurposed for the school at a later date if capital funds can be raised. The developer of this property has indicated there is also an event space that is located in the campus that could be made available to the school during the school day hours when it is not booked.

   The refurbishment cost of this facility has been estimated by IFF to be $30 per square foot, or $360,000 for the first building of 12,000 sq.ft. The lease cost is expected to be $8 per square foot.

Figure 9 Facilities available at Central State (12,000 sq ft and 20,000 sq ft)

2. **Bockhold Hall (902 Holmes).** This is an old school building formerly owned by the Holy Trinity Church and currently owned by Indiana Landmarks. It has 21,000 sq. ft of usable space with a gym/theatre space on the second floor, six large classrooms on the first floor and usable space in the basement. This building can be used as a starter space, and an additional building can be built in year three in the vacant lot across the street.

Figure 10 Bockhold Hall

A preliminary space requirement is shown in Table 16.

Grades	**9, 10**	**9-12**
# students	200	400
# students/class	25	25
# classrooms	8	16
sq. ft/class	600	600
	4,800	9,600
Bio-science lab	1,000	1,000
Computer Science lab	1,000	1,000
Physics/Chem lab	1,000	1,000
Physics/Chem lab		1,000
Fab Lab		1,000
Arts studio	1,000	1,000
Dance studio	1,000	1,000
Music room		1,000
Drama/Theatre/Film		1,000
Spec Needs Resource room	400	600
Guidance/career office	200	400
First-aid room	200	200
Library	600	2,000
Cafeteria/Amphitheatre	1,000	2,000
Small group work spaces	300	600
Individual study nooks		600
Reception	250	250
Teachers workspaces		900
Senior student workspaces		750
Family center	250	250
Admin offices	260	380
Students washrooms	144	252
Staff washrooms	60	120
	13,464	27,902

Table 16 Preliminary space requirements for TechIndy

Figure 11 provides a preliminary sketch of the desired layout for the proposed school. This sketch incorporates various elements of 21st Century educational environments developed in Nair, Fielding and Lackney (2013).

1. The mid-section will serve as a student display area, a "watering hole" area with soft seating and a "camp-fire" amphitheater for informal student performances. We hope also to have access to a auditorium for formal student performances.

2. Surrounding the center area will be biotechnology, design and computer laboratories for the Project Lead the Way pathways.
3. To the north of the community area will be a music room/dance studio, an art studio and a theatre/film studio.
4. To the northwest, an open-plan faculty common room will be setup with workstations, round meeting tables and moving whiteboards for faculty collaboration.
5. Five classrooms organized as seminar-style rooms.
6. Six classrooms with movable seating and tables, moveable separating walls between pairs of classrooms, and whiteboard painted walls.
7. A science laboratory and a library, the latter with student independent workstations.
8. A learning center used for pull out sessions for special education students will be available to the northeast.
9. Where possible all classrooms will be converted to half-height glass walls to allow for the idea of open classrooms and for line of sight visibility.

The layout will be finalized once the facility is identified and detailed drawings are available, and is highly dependent on costs involved in refurbishing the facility to this design.

H. Transportation

The school will provide bus-passes to F&RL eligible students who live on a bus route that can get to the school within 30 minutes travel time – these passes currently cost $35 per month. For students who live in certain targeted areas such as the 46218 area or the Northwest area, the school will provide transportation using sub-contracted services from Miller Transportation.

I. Risk Management

Tech-Indy will use the COSO[13] risk management framework with the following elements:

1. A structured process for identifying risks throughout the institution
2. Assessing the impact of the identified risks
3. Developing and implementing mitigation plans
4. Monitoring mitigation plans, re-prioritizing risks and looking for emerging risks

Risks will be identified and addressed in the following areas: Legal and Compliance, Financial, Operational, Student safety, Reputational. While most schools do not separate out the student

[13] Steinberg et al (2004). Enterprise Risk Management – Integrated Framework. Committee of Sponsoring Organizations of the Treadway Commission

safety elements, we have chosen to do so as safety of students is an imperative in schools and is a significant risk. Table 17 shows the major risks in each of these areas faced by a school.

Legal & Compliance	**Financial**	**Operational**	**Student safety**	**Reputational**
Federal IDEA/Title I,I, III, IX	Enrolment	Facilities, Supplies & transportation	Bullying/Cyber-bullying	Student performance
State funding & reporting requirements	Financial theft and fraud	Pollution	Harassment	Teacher performance, retention, values
Labor laws, ADA law, etc.	Conflict of interest	Cyber-security	Weapons/drugs/fights in schools	
IRS 501 (c) (3) regulations	Cash reserves	Teacher availability, turnover, performance	Facilities and transportation accidents	Student and teacher behavior outside school
	Investment and interest rate		Student information security	
	Disaster recovery and business continuity			
Liability			Adult screening	

Table 17 Major risk areas in a school

After identify the likelihood of risk, strategies will be developed to avoid, prevent, reduce or transfer the risk. Most risks will require a combination of these strategies.

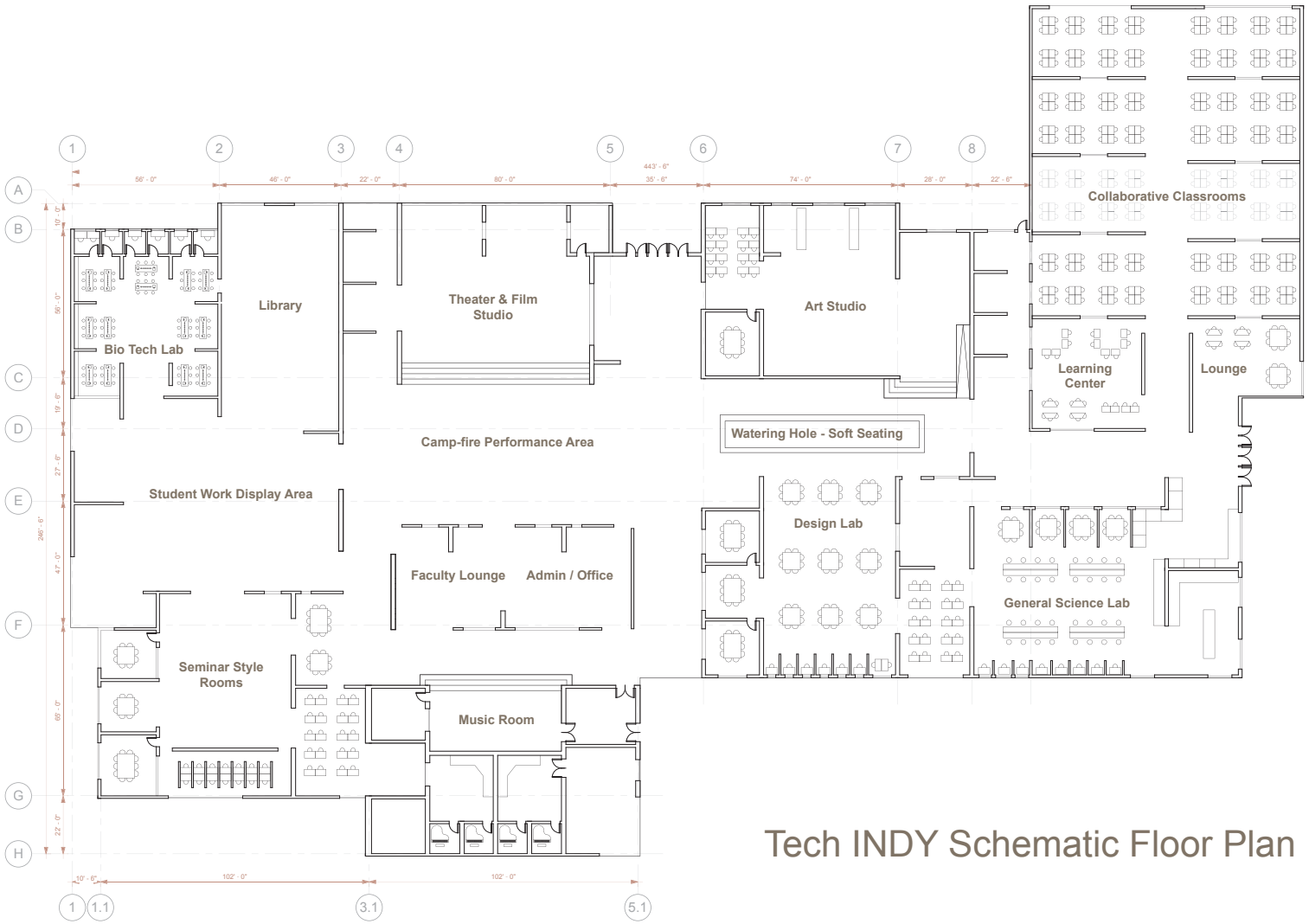
The Executive Director will be responsible for ensuring the risk management strategies are implemented, and the quarterly internal audits will review the risk management efforts and report to the Board.

An estimate of insurance is provided in Appendix 10. This will cover liability for malpractice regarding students with special needs. The provider of services for exceptional students will also have their own liability insurance.

J. Timeline

A timeline for getting the school into operation is shown below.

Task	Timeline
Expected approval of charter	November 9, 2016
Facilities	
Finalization of facility selection and contract negotiation	December 31 2016
Finalization of layout, refurbishment requirements	December 31 2016
Selection of contractor	January 31 2016
Furniture, IT, equipment order	April 1 2017
Facilities refurbishment complete	May 31 2017
Furniture received and installed	June 30th 2017
Community engagement and student recruitment	
Identify and meeting with community leaders and liaisons	October 2016 – Dec 2017
Hold community presentations	Nov. 2016 to Jan. 31st 2017
Update website and Facebook	November 30 2016
Parent presentations and information sessions (2-4 per week in Jan and Feb, 1 per week March-June as needed)	Jan 2017 – Jun 2017
Summer camps	Jun 1 – Jun 30 2017
Student enrollment – open enrollment - lottery	Jan 2016 – Mar 2017 Apr – June 2017
Student diagnostic testing	Jul 15 – Jul 31 2017
Staff Recruitment & training	
Dean of Academics recruited	Feb 1 2017
Training of DoA- Project-based, Inquiry-based	Feb – Jun 2017
Job Descriptions, Job postings completed	Feb 28 2017
Dean of Students, Business Manager recruited	May 1 2017
4 Lead Teachers recruited	June 1 2017
Summit Schools training for lead teachers and DoA	June 30 2017
Staff recruitment	Feb 1 – June 30 2017
Staff training	July 5 – July 31 2017
Operations/Finance/Academic Policies and procedures development	
First draft of policies for Board review	March 31 2017
Board review and revisions; Board approval for launch version	May 31 2017
Systems Implementation	
Financial system, payroll system in place	May 31 2017
School information system in place	May 31 2017
Learning management system in place	June 15 2017
Curriculum and assessment development, lesson planning	
Curriculum & Assessment Development – maps, preliminary by DoA and lead teachers	Jun 1 – Jun 30 2017
Curriculum & Assessment finalization	Jul 1 – Jul 31 2017
Lesson planning for first term	Jul 1 – Jul 31 2017
School Opens	**August 1 2017**



Tech INDY Schematic Floor Plan

Appendix

Appendix 1: Goals

Goal 1
School-Specific Goal for: TechIndy School of Science and Engineering

Mission Statement: *The mission of our charter school is to enable students from diverse backgrounds to participate fully in the innovation-based, globalized, multi-cultural world of today, by becoming leaders in STEM disciplines and creating a better world for their families, their communities and future generations.*

Goal: What will our school accomplish? *At least 65% of seniors (increasing to 75% in later years) will graduate with an International Baccalaureate Diploma, or an IB Career Certificate with a PLTW career pathway certificate*

Annual Targets: How will we know that we have achieved this goal?

Goal: *At least 65% of seniors (increasing to 75% in later years) will graduate with an International Baccalaureate Diploma, or an IB Career Certificate with a PLTW career pathway certificate*					
Charter Year	**Calendar Year**	**Exceeds Standard**	**Meets Standard**	**Approaching Standard**	**Does Not Meet Standard**
1	2017-18	Not applicable, school has Grade 9 and 10 only			
2	2018-19	Not applicable, school has Grade 9-11 only			
3	2019-20	≥70% meet	65-69% meet	60-64% meet	< 60% meet
4	2020-21	≥70% meet	65-69% meet	60-64% meet	< 60% meet
5	2021-22	≥75% meet	70-74% meet	65-69% meet	< 65% meet
6	2022-23	≥75% meet	70-74% meet	65-69% meet	< 65% meet
7	2023-24	≥75% meet	70-74% meet	65-69% meet	< 65% meet

Assessment Tools and Measures: How will we measure achievement of this goal, using mandated assessments and/or school-specific assessments (such as portfolios, juried performances)?

a. *To obtain an IB Diploma, students are required to complete six IB courses (three at high level) and three core requirements (Extended Essay, Theory of Knowledge and Creativity-Action-Service) with a minimum combined score of 24 points, all of which are assessed using a rigorous combination of internationally standardized examinations and in-school assessments.*
b. *To obtain an IB career certificate, students are required to complete a minimum of two IB courses, three core requirements, and a career pathway. In our case, the career pathway is one of the PLTW pathways. PLTW has its own end of course assessments, which are used to assess satisfactory performance by students.*

Attachments: Attachments to illustrate the performance goal and assessments. (Note and attach relevant school-developed assessments and/or assessment tools. If a school-developed assessment or tool is still under development, note this here along with the date when it will be ready for submission, and submit it to the Mayor's Office once it is developed.)

The assessments used by the IB and PLTW are standardized internationally by the respective organizations and samples are provided.

Rationale for Goal and Measures: Why is this goal important to our mission, and why is our chosen method of assessment appropriate and useful for measuring performance toward this goal? (2-3 sentences)

This goal is important in the school meeting its mission of preparing students to become leaders in STEM careers who create a better world. Meeting the IB requirements prepares students for college and for leadership, and meeting the PLTW requirements prepares students for STEM careers.

Assessment Reliability and Scoring Consistency: How will we demonstrate both the **reliability and scoring consistency of the assessment(s) we plan to use, if non-standardized?**
The IB examinations are graded using IB trained and certified examiners who are teachers in IB-authorized schools around the country, and the in-school assessments are moderated using a random sample by IB-certified examiners. Similarly, PLTW End-of-Course assessments are graded by PLTW, providing an objective assessment of students' performance

Baseline Data: What is our beginning data point?
As this is a new school and the first graduates will be in 2020, there is no baseline data. However, a baseline comparison can be established by reviewing IPS school data - only 8% of IPS high school students currently pass an AP exam. The IB exams are considered equivalent or of higher difficulty than the AP, and in order to obtain an IB Career certificate, students are expected to pass two IB subjects and get a PLTW career certificate. Thus the school's goal is higher than the current IPS baseline performance.

School-Specific Goal for: TechIndy School of Science and Engineering

Mission Statement: *The mission of our charter school is to enable students from diverse backgrounds to participate fully in the innovation-based, globalized, multi-cultural world of today, by becoming leaders in STEM disciplines and creating a better world for their families, their communities and future generations.*

Goal: What will our school accomplish? *Graduating students will obtain admission to a STEM associate degree or bachelor's degree program.*

Annual Targets: How will we know that we have achieved this goal?

Goal: *At least 50% of graduating students (increasing to 70% in later years) will obtain admission to a STEM associate degree or bachelor's degree program.*					
Charter Year	**Calendar Year**	**Exceeds Standard**	**Meets Standard**	**Approaching Standard**	**Does Not Meet Standard**
1	2017-18	Not applicable, school has Grade 9 and 10 only			
2	2018-19	Not applicable, school has Grade 9-11 only			
3	2019-20	≥ 50% meet	45-49% meet	40-44% meet	< 40% meet
4	2020-21	≥ 50% meet	45-49% meet	40-44% meet	< 40% meet
5	2021-22	≥ 55% meet	45-54% meet	40-44% meet	< 40% meet
6	2022-23	≥ 60% meet	50-59% meet	45-49% meet	< 45% meet
7	2023-24	≥ 70% meet	60-69% meet	50-59% meet	< 50% meet

Assessment Tools and Measures: How will we measure achievement of this goal, using mandated assessments and/or school-specific assessments (such as portfolios, juried performances)?

The Careers Counselor and teachers in their Advisory groups will work with all Grade 11 and 12 students to develop and implement a college application plan which will be monitored and reported to School Leaders and the Board on a monthly basis. The Careers Counselor and teachers will monitor college admissions for a period of six months after graduation to track this metric.

Attachments: Attachments to illustrate the performance goal and assessments.
None

Rationale for Goal and Measures: Why is this goal important to our mission, and why is our chosen method of assessment appropriate and useful for measuring performance toward this goal? (2-3 sentences)
This goal is important in the school meeting its mission of preparing students to become leaders in STEM careers who create a better world. Ensuring students apply to college and helping them get admission to a college will ensure they enter STEM careers.

Assessment Reliability and Scoring Consistency: How will we demonstrate both the **reliability and scoring consistency of the assessment(s) we plan to use, if non-standardized?**
There is some risk of losing contact with students after graduation and thus losing reliability on this metric, but we hope that the relationships that teachers create in the school will reduce the risk.

Baseline Data: What is our beginning data point?
Data from the IDOE shows that only 12% of college students in Indiana pursue STEM degrees. Our goal will be to achieve a much higher percentage of graduates pursuing STEM degrees.

Goal 3

School-Specific Organizational Goal for: TechIndy School of Science and Engineering

Mission Statement: *The mission of our charter school is to enable students from diverse backgrounds to participate fully in the innovation-based, globalized, multi-cultural world of today, by becoming leaders in STEM disciplines and creating a better world for their families, their communities and future generations.*

Goal: What will our school accomplish? *At least 60% teachers (increasing to 75% in later years) show competence in the school's pedagogical model as measured by school leadership's evaluations of teacher practice*

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Annual Targets: How will we know that we have achieved this goal?

Goal: *At least 50% of teachers (increasing to 70% in later years) show competence in the school's pedagogical model as measured by school leadership's evaluations of teacher practice*					
Charter Year	**Calendar Year**	**Exceeds Standard**	**Meets Standard**	**Approaching Standard**	**Does Not Meet Standard**
1	2017-18	>60% of teachers exhibit use of the model	55-60%	50-54%	<50%
2	2018-19	> 65%	55-60%	50-54%	<50%
3	2019-20	> 65%	55-60%	50-54%	<50%
4	2020-21	> 70%	65-70%	60-64%	<60%
5	2021-22	> 70%	65-70%	60-64%	<60%
6	2022-23	> 70%	65-70%	60-64%	<60%
7	2023-24	> 75%	70-75%	60-69%	<60%

Assessment Tools and Measures: How will we measure achievement of this goal, using mandated assessments and/or school-specific assessments (such as portfolios, juried performances)?

The school leadership team will develop an evaluation system that uses the school's pedagogical model as one domain. The teacher's pedagogical practice will be assessed in this domain using a rubric, of which a draft is shown below.

Attachments: Attachments to illustrate the performance goal and assessments.

A preliminary rubric for use in measurement of this goal is provided below. This will be refined once the leadership team is in place at the school.

Rationale for Goal and Measures: Why is this goal important to our mission, and why is our chosen method of assessment appropriate and useful for measuring performance toward this goal? (2-3 sentences)

This goal is important in ensuring that the school faculty develops and uses a common vision for good teaching and learning.

Assessment Reliability and Scoring Consistency: How will we demonstrate both the **reliability and scoring consistency of the assessment(s) we plan to use, if non-standardized?**

All three members of the school leadership team will review teachers' work and observe teachers in the classroom and develop a consensus assessment of proficiency against the model.

Baseline Data: What is our beginning data point? *A baseline will be established at the end of the first semester in the 2017-2018 school year.*

Rubric for assessing teacher proficiency in the school's pedagogical model

	Emerging	Approaching	Competent	Proficient
Inquiry-based learning as the core pedagogy				
Project-based learning for authentic learning				
Inter-disciplinary learning to provide integration of knowledge				
Personalized learning				
Studio habits of mind infused in lesson				
Learning tasks show Levels 3 or higher in Webbs Depth of Knowledge matrix				
Performances of understanding show depth of knowledge and conceptual understanding				
Use of formative assessments for learning				
Positive Behavior Supports				
Use of supportive classroom management strategies				
Social-emotional and executive function development activities				
Support for inclusion				
Support for ELL students in class				
Use of reflection and meta-cognition by students				

Goal 4

School-Specific Organizational Goal for: TechIndy School of Science and Engineering

Mission Statement: *The mission of our charter school is to enable students from diverse backgrounds to participate fully in the innovation-based, globalized, multi-cultural world of today, by becoming leaders in STEM disciplines and creating a better world for their families, their communities and future generations.*

Goal: What will our school accomplish? *At least 70% of stakeholders (students, parents, teachers) exhibit satisfaction with the school as measured by a school-designed survey administered by a community-based organization.*

Annual Targets: How will we know that we have achieved this goal?

Goal: *At least 70% of stakeholders (students, parents, teachers) exhibit satisfaction with the school as measured by a school-designed survey administered by a community-based organization.*					
Charter Year	**Calendar Year**	**Exceeds Standard**	**Meets Standard**	**Approaching Standard**	**Does Not Meet Standard**
1	2017-18	> 75%	70-74%	65-69%	<65%
2	2018-19	> 75%	70-74%	65-69%	<65%
3	2019-20	> 75%	70-74%	65-69%	<65%
4	2020-21	> 80%	75-79%	70-74%	<70%
5	2021-22	> 80%	75-79%	70-74%	<70%
6	2022-23	> 85%	75-85%	70-74%	<70%
7	2023-24	> 85%	75-85%	70-74%	<70%

Assessment Tools and Measures: How will we measure achievement of this goal, using mandated assessments and/or school-specific assessments (such as portfolios, juried performances)?

A satisfaction survey will be developed by the school leadership team and administered to parents, students, and teachers twice a year by a community-based organization partner of the school.. The end-of-year survey will be used for this measurement and each group's average rating will be reviewed separately.

Attachments: Attachments to illustrate the performance goal and assessments.

A preliminary tool for use in measurement of student satisfaction is provided below. This will be refined once the leadership team is in place and similar tools will be developed for parents and teachers.

Rationale for Goal and Measures: Why is this goal important to our mission, and why is our chosen method of assessment appropriate and useful for measuring performance toward this goal? (2-3 sentences)

This goal is important in ensuring that the three key stakeholder groups have a voice and are heard.

Assessment Reliability and Scoring Consistency: How will we demonstrate both the **reliability and scoring consistency of the assessment(s) we plan to use, if non-standardized?**

All three members of the school leadership team will review teachers' work and observe lessons

Baseline Data: What is our beginning data point? A baseline will be established at the end of the first semester in the 2017-2018 school year.

Preliminary draft of Student Satisfaction Survey

Please express your satisfaction with the following aspects of the school:	**Not Satisfied**	**Somewhat Satisfied**	**Highly Satisfied**
School Culture			
Student sense of belonging in the school			
Teachers take a high level of interest in your success			
The school has a culture of caring and community with all members supporting each other			
The school provides a safe and respectful environment for learning			
Students have a voice in matters of importance to them			
Instances of bullying and indiscipline are dealt with promptly and fairly with student involvement where appropriate			
The school has a culture of high expectations and support to achieve excellence			
Students having difficulty in their home lives know where to go for help through the school			
School operations			
The building is clean and well maintained			
Buses run on time, are clean and well maintained			
School custodian, security and IT staff are helpful and friendly			
Learning and Teaching			
The learning process involves students actively in their learning			
Students are engaged in learning activities that are varied, relevant and meaningful			
The inter-disciplinary projects are valuable for student learning			
Students get opportunities to exhibit their learning to the broader school community			
The level of technology available and used in the learning process is high			
The level of learning and reference materials is sufficient			
Students have adequate opportunities to be involved in the community in a positive way			
When students have difficulty with a particular concept or subject, they know how to get support for their learning			

Appendix 2: Draft School Discipline Policy

(to be reviewed and ratified by school community and Board)

General Principles

The goal of the school discipline policy and practices is to teach students to behave in ways that contribute to a positive school climate focused on building and restoring respect and relationships in the school community. Disciplinary practices will use a three-tiered system of supports, similar to the RTI model, where the Tier 1 universal focus is to building relationships through affective language, positive behavior supports, and pro-active circles; Tier 2 practices involve restorative conversations, peer mediation and responsive circles; and Tier 3 involve formal restorative justice conferences. A fourth level is designated for actions causing grievous harm or damage that need to be dealt with immediately through suspension or expulsion can take place, though the path may be open for return if the school community agrees to it.

The following principles will guide the school's disciplinary practices.

- School safety and academic success are strengthened when all school staff and personnel build positive relationships with students and are actively engaged in their lives and learning.
- School staff should promote high standards of behavior by teaching, modeling, and reinforcing positive behavior.
- School discipline that is paired with meaningful instruction and guidance offers students an opportunity to learn from their mistakes and contribute to the school community, and is more likely to result in getting the student re-engaged in learning.
- The vast majority of disciplinary issues should be addressed at the classroom level by teachers and through restorative dialogue and pro-active circles.
- Students will most likely make positive change when those in authority do things with them, rather than to them.
- The use of exclusionary measures such as out-of-school suspensions, expulsions, and referrals to alternative schools that exclude students from school will be minimized.
- The role of law enforcement will be limited to situations when it is necessary to protect the physical safety of students and staff or appropriate to address criminal behavior
- The school recognizes that there are often systemic racial inequalities in the administration of school discipline and school leadership will make every effort to ensure that racial or ethnic biases do not affect disciplinary practices.
- Similarly, the school recognizes that students with disabilities are often inordinately given harsh consequences for behavior issues, which may actually be a manifestation of the student's disability.
- The school will provide students and parents/guardians with a fair hearing before suspension, expulsion or referral to alternative school is decided.

Disciplinary Interventions Matrix

	Intervention Level			
Behaviour Issue	**1**	**2**	**3**	**4**
Attendance				
- lateness	X	X		
- unexcused absence	X	X		
- cutting class	X	X		
Dress Code				
- not abiding by school dress code	X	X		
Academic dishonesty				
- class assignment	X	X	X	
- summative assessment		X	X	
- ISTEP/IB/PLTW assessment				
Alcohol/illegal or controlled substances				
- usage or possession	X	X		
- selling			X	X
Damage to school property				
- depending on severity		X	X	X
Damage to others property		X	X	X
Inappropriate use of technology				
- Accessing pornographic material		X	X	
- Accessing/changing school records		X	X	
- Cyber-harassment/bullying		X	X	X
- Using cell-phones in school	X	X		
- Using other devices	X	X		
Disrespectful behavior				
- Walking away	X			
- Using verbal insults or hostile language	X	X		
- Profane language		X	X	
- Offensive/obscene gestures		X		
- Derogatory written materials		X	X	
Refusal of school work	X	X	X	
Inappropriate displays of affection				
- public displays of affection	X	X		
- inappropriate sexual behavior			X	X
Assault/Bullying/Hazing			X	X
Arson				X
Vandalizing School property			X	X
Carrying/use of weapons			X	X

Intervention/Responses

Level	Intervention	Remedy/Consequence
1	Responsive conversations and pro-active circles - reminder and redirection - teaching of behavior expectation	-Written apology -Reflective essay -Restorative tasks
2	Restorative conversations and circles Peer jury and mediation	-Problem solving -Repairing harm - in-school suspension - voluntary forfeit of privileges
3	Formal Restorative conferencing involving family, school leaders, and community leaders	-1-3 day Out-of school Suspension with fair hearing - Community decision on remedy with victim and offender's agreement Behavior action plan
4	Expulsion Referral to alternative education Referral to law enforcement	

Process for Involving parents in the disciplinary process

Parents will be notified of level 1 issues through end of term report cards and three-way conferences held once a term. If a level 1 issue is repeated several times, the teacher will call parents for a three-way conference, or the teacher may initiate a home visit to discuss the situation.

Parents will be notified of level 2 issues after resolution has been developed at the restorative circles or peer juries, and a three-way conference will be held with the parent. Parents will be advised of the remedy agreed at the school level and will be asked to work with the school to ensure the remedy has been carried out.

Level 3 and 4 issues require immediate parent involvement. These are serious issues and social workers as well as community members will be involved in the formal restorative conferencing. In the case of level 4 issues, the circumstance and the process for a fair hearing will be explained to the parents and students at a joint meeting if possible, or separately if needed. IPS will be notified of Level 3 and 4 issues and they will be asked to join in the decision-making process.

Appendix 3: Exit Standards

A. English/Language Arts Exit Standards

<table>
<tr><th>Indiana Academic Standards for Grades 11-12 Learning Outcomes</th><th>IB DP Language and Literature
Learning Outcomes</th></tr>
<tr><td>Reading - Literature
11-12.RL.1 Read a variety of literature within a range of complexity appropriate for grades 11-CCR. By the end of grade 11, students interact with texts proficiently and independently at the low end of the range and with scaffolding as needed for texts at the high end of the range. By the end of grade 12, students interact with texts proficiently and independently.
Sub-domains: Key Ideas and Textual Support, Structural Elements and Organization, Synthesis and Connection of Ideas</td><td>Part 4: Literature – Critical Study
- Explore literary works in detail, including understanding the explicit and implicit meanings in text, identify and situating the text in the context of larger work, responding to key features such as language, characterization and structure
- Analyzing elements such as theme and ethical stance or moral values of literary texts
- Understand and make use of appropriate literary terms such as imagery, persona, tone, metaphor, irony</td></tr>
<tr><td>Reading - Nonfiction
11-12.RN.1 Read a variety of nonfiction within a range of complexity appropriate for grades 11-CCR. By the end of grade 11, students interact with texts proficiently and independently at the low end of the range and with scaffolding as needed for texts at the high end of the range. By the end of grade 12, students interact with texts proficiently and independently.
Sub-domains: Key Ideas and Textual Support, Structural Elements and Organization, Synthesis and Connection of Ideas</td><td rowspan="3">Part 1: Language in Cultural Context

Part 2: Language in Mass Communication

Part 3: Literature – Texts and Contexts
- Consider the changing historical, cultural and social contexts in which particular texts are written and received
- Demonstrate how the formal elements of the text, genre and structure can not only be seen to influence meaning but can also be influenced by context
- Understand the attitudes and values expressed by texts and their impact on readers

Language Skills:
- Students are expected to acquire the vocabulary appropriate to the analysis of texts. Further, they develop the ability to express their ideas in clear, unambiguous language. Students will be expected to show facility in both written and oral communication.

Assessments
- include comparative textual analysis, written essay, four written tasks (each 800-1000 words in length).</td></tr>
<tr><td>Reading - Vocabulary
11-12.RV.1 Acquire and use accurately general academic and content-specific words and phrases at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</td></tr>
<tr><td>Writing
11-12.W.1 Write routinely over a variety of time frames for a range of tasks, purposes, and audiences; apply reading standards to support analysis, reflection, and research by drawing evidence from literature and nonfiction texts.
Sub-domains: Writing Genres, Writing Process, Research Process, Conventions of Standard English</td></tr>
</table>

Speaking and Listening **11-12.SL.1**_Listen actively and adjust the use of spoken language (*e.g., conventions, style, vocabulary*) to communicate effectively with a variety of audiences and for different purposes. **Sub-domains:** *Discussion and Collaboration, Comprehension, Presentation of knowledge and ideas*	Speaking and listing are embedded in the learning outcomes and are not explicitly specified in the IB Language and Literature guide. However, oral language **is** explicitly assessed at the end of the course s through students' responses to two guiding questions on a literary text and two additional oral activities.
Media Literacy **11-12.ML.1** Critically analyze information found in electronic, print, and mass media used to inform, persuade, entertain, and transmit culture.	**Part 2: Language and Mass Communication** - Examine different forms of communication within the media - Show an awareness of the potential for education, political or ideological influence of the media - Show the way mass media uses language and image to inform, persuade or entertain

It should be noted that the IB Language and Literature syllabus and guide is written for a wide range of country contexts and, as such, it is not possible to find an exact mapping of Indiana state standards in the IB syllabus. However, one can find evidence of the standards in the description of the different syllabus domains, the skills development statement, and the assessment descriptions, as has been attempted above.

B. Mathematics Exit Standards

IB Mathematics Standard/Higher Level (italics indicate topics only covered at HL)	**# hrs for HL**	**# hrs for SL**	**Indiana Standards**
1. Algebra 1. sequences and series 2. exponents & logarithms 3. permutations & combinations, binomial theorem *4. proof by induction* *5. complex numbers* *6. modulus-argument form, complex plane* *7. de Moivre's theorem for powers of complex numbers, nth roots* *8. conjugate roots of polynomial eq.s* *9. solutions of systems of linear eq.s*	30	9	 AII.EL.1 AII.EL.2 AII.CNE.1
2. Functions & Expressions 1. odd & even functions, composite functions, identity function, inverse function 2. graphs of functions, key features of graphs 3. transformations of graphs 4. rational function and its graph 5. polynomial functions and their graphs 6. solving quadratic equations, solving polynomial equations graphically & algebraically 7. solutions of g(x) >= f(x)	22	24	 AII.F.3 AII.F.4 AII.F.5 AII.PR1-2, PC.QPR.2 AII.SE.1-3
3. Circular functions & trigonometry 1. circle, radian, length of arc, area of sector 2. sin, cos, tan in terms of unit circle, sec, csc, cot, values of sin, cost, tan π/6, pythagoran identities *3. compound angle, double angle identities* *4. composite functions* *5. inverse functions of x->arcsin x* 6. algebraic and graphical methods of solving trigonometric equations 7. cosine rule, sine rule, area of triangle	22	16	
4. Vectors 1. concept of vector, representation, unit vectors, components of vectors 2. scalar product of two vectors 3. vector equation of a line 4. coincident, parallel, intersecting and skew lines *5. vector product of two vectors* *6. vector equation of a plane* *7. intersections of a line with a plane, two planes, three planes*	24	16	

5. Statistics & Probability 1. populations, samples, random samples frequency distribution, mean, variance, standard distribution 2. trial, outcomes, probability of events, complementary events, venn diagrams, tree diagrams, tables *3. combined events* *4. conditional probability, independent events Bayes theorem* 5. discrete & continuous random variables and probability distributions, probability density functions, expected value, mode, median 6. binomial distribution, mean and variance 7. normal distribution	36	35	 AII.DSP.3 AII.DSP.5 AII.DSP.5
6. Calculus 1. Limit, continuity, congruence, definition of derivative, equations of tangents and normals, increasing and decreasing functions, second derivative, higher derivatives 2. Derivatives of xn, sin x, cos x, tan x, ex and ln x; differentiation of sums and multiples of functions, product and quotient rules, chain rule, related rates of change, implicit differentiation, derivatives of sec x csc x cot x ax, loga x, arcsin x, arcos x, arctan x 3. Local min and max values, optimization, points of inflexion, graphical behavior of functions 4. Indefinite integration, indefinite integral of xn, sin x, cos x, ex *5.* Anti-differentiation with boundary condition, area of region enclosed by curve, volumes of revolution 6. Kinematic problems 7. *Integration by substitution, integration by parts*	48	40	 C.LC.1-5 C.D.8 C.D.1-11 C.AD.1-6 C.I.1 C.I.1-3, C.I.5 C.I.4
7. One of the following options: a) Statistics & probability; b) Calculus; c) Discrete Mathematics;	48	-	
8. Individual Mathematical Exploration	10	10	
	240	**150**	

C. Standards Used in PLTW Capstone courses

a. ITEA Technological Literacy Standards

TABLE 2.1 Listing of Standards for Technological Literacy

CHAPTERS	STANDARDS
3 Students will develop an understanding of The Nature of Technology. This includes acquiring knowledge of:	1 The characteristics and scope of technology. 2 The core concepts of technology. 3 The relationships among technologies and the connections between technology and other fields.
4 Students will develop an understanding of Technology and Society. This includes learning about:	4 The cultural, social, economic, and political effects of technology. 5 The effects of technology on the environment. 6 The role of society in the development and use of technology. 7 The influence of technology on history.
5 Students will develop an understanding of Design. This includes knowing about:	8 The attributes of design. 9 Engineering design. 10 The role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
6 Students will develop Abilities for a Technological World. This includes becoming able to:	11 Apply the design process. 12 Use and maintain technological products and systems. 13 Assess the impact of products and systems.
7 Students will develop an understanding of The Designed World. This includes selecting and using:	14 Medical technologies. 15 Agricultural and related biotechnologies. 16 Energy and power technologies. 17 Information and communication technologies. 18 Transportation technologies. 19 Manufacturing technologies. 20 Construction technologies.

b. National Health Science Standards

http://www.healthscienceconsortium.org/wp-content/uploads/2015/07/National-Health-Science-Standards.pdf

D. Standards Used in the Global Issues Seminar and Capstone

a. Asia Society Global Leadership Performance Outcomes

Asia Society Center for Global Education

GRADUATION PERFORMANCE SYSTEM

grade 12

Global Leadership

PERFORMANCE OUTCOMES

Investigate the World

What is the evidence that a student can initiate investigations of the world by framing questions, analyzing and synthesizing relevant evidence, and drawing reasonable conclusions about global issues?

- Poses a specific researchable question on a local, regional, and/or global issue, and explains its significance to the global community.
- Selects and uses a variety of international and domestic sources to identify and weigh the most important evidence that addresses a global question.
- Analyzes, integrates, and evaluates sources of evidence to develop a coherent, well-supported response to a global question.
- Develops a clear position based on evidence from sources that considers multiple perspectives, and draws defensible conclusions in response to a global question.

Recognize Perspectives

What is the evidence that a student can recognize, articulate, and apply an understanding of different perspectives (including his/her own)?

- Expresses and explains a clear and specific personal perspective on a situation, event, issue, or phenomenon, and describes influences on that perspective.
- Explains the perspectives of other people, groups, or scholars and distinguishes it from one's own perspective.
- Explains how perspectives influence human interactions and understandings of a situation, event, issue, or phenomenon.
- Explains how different contexts, such as access to knowledge, technology, and resources, influence perspectives and interpretations of a situation, event, issue, or phenomenon.

Communicate Ideas

What is the evidence that a student can select and apply appropriate tools and strategies to communicate and collaborate effectively, meeting the needs and expectations of diverse individuals and groups?

- Anticipates how audiences with diverse perspectives will interpret communicated information; applies that understanding to meet the needs of the diverse audience.
- Demonstrates an understanding of diverse audiences by communicating and collaborating using verbal and non-verbal behavior, language, and strategies that are appropriate to specific audiences.
- Selects and applies appropriate resources, such as technology and media, to communicate and collaborate effectively with diverse individuals and groups.
- Makes accurate, specific observations about audience response and/or feedback, and makes appropriate changes leading to improved communication.

Take Action

What is the evidence that a student can translate his/her ideas, concerns, and findings into appropriate and responsible individual or collaborative actions to improve conditions?

- Identifies and creates opportunities for personal or collaborative actions to address a situation, event, issue, or phenomenon in a way that is likely to improve conditions.
- Assesses options and plans actions based on evidence that indicates the potential for impact by evaluating previous approaches, varied perspectives, and/or potential consequences.
- Acts individually or collaboratively to execute a plan that is culturally responsive, and strongly likely to improve a local, regional, and/or global situation, and assesses the impact of the action.
- Reflects on the effectiveness and cultural appropriateness of own actions and advocacy for improvement; and honestly describes the results of actions and implications for future actions and advocacy.

b. IB DP Global Politics

International Baccalaureate Diploma Programme Subject Brief

Individuals and societies: Global politics—higher level

First assessments 2017—last assessments 2023

The IB Diploma Programme (DP) is a rigorous, academically challenging and balanced programme of education designed to prepare students aged 16 to 19 for success at university and life beyond. The DP aims to encourage students to be knowledgeable, inquiring, caring and compassionate, and to develop intercultural understanding, open-mindedness and the attitudes necessary to respect and evaluate a range of viewpoints. Approaches to teaching and learning (ATL) are deliberate strategies, skills and attitudes that permeate the teaching and learning environment. In the DP, students develop skills from five ATL categories: thinking, research, social, self-management and communication.

To ensure both breadth and depth of knowledge and understanding, students must choose six courses from six distinct groups: 1) studies in language and literature; 2) language acquisition; 3) individuals and societies; 4) sciences; 5) mathematics; 6) the arts. Students may choose to replace the arts course with a second course from one of the other five groups. At least three, and not more than four, subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge and creativity, activity, service—are compulsory and central to the philosophy of the programme.

These DP subject briefs illustrate four key course components.

I. Course description and aims
II. Curriculum model overview
III. Assessment model
IV. Sample questions

I. Course description and aims

The DP global politics course explores fundamental political concepts such as power, equality, sustainability and peace in a range of contexts. It allows students to develop an understanding of the local, national, international and global dimensions of political activity and processes, as well as to explore political issues affecting their own lives. The course helps students to understand abstract political concepts by grounding them in real-world examples and case studies. It also invites comparison between such examples and case studies to ensure a wider and transnational perspective.

Teachers explicitly teach thinking and research skills such as comprehension, text analysis, transfer, and use of primary sources. The study of global politics enables students to critically engage with different and new perspectives and approaches to politics in order to comprehend the challenges of the changing world and become aware of their role in it as active global citizens.

The aims of the global politics course are to enable students to:

- understand key political concepts and contemporary political issues in a range of contexts
- develop an understanding of the local, national, international and global dimensions of political activity
- understand, appreciate and critically engage with a variety of perspectives and approaches in global politics
- appreciate the complex and interconnected nature of many political issues, and develop the capacity to interpret competing and contestable claims regarding those issues.

II. Curriculum model overview

Component	Recommended teaching hours
Core units: People, power and politics Four compulsory units: 1. Power, sovereignty and international relations 2. Human rights 3. Development 4. Peace and conflict	**130**
Engagement activity An engagement on a political issue of personal interest, complemented with research.	**20**
HL extension: Global political challenges Political issues in two of the following six global political challenges are researched and presented through a case study approach. 1. Environment 2. Poverty 3. Health 4. Identity 5. Borders 6.Security	**90**

c. Next-Generation Science Standards (NGSS)

HS.Engineering Design

HS.Engineering Design

Students who demonstrate understanding can:

HS-ETS1-1. **Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.**

HS-ETS1-2. **Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.**

HS-ETS1-3. **Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.**

HS-ETS1-4. **Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.**

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (HS-ETS1-1)

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (HS-ETS1-4)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories.

- Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-ETS1-2)
- Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-ETS1-3)

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (HS-ETS1-1)
- Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (HS-ETS1-1)

ETS1.B: Developing Possible Solutions

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (HS-ETS1-3)
- Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (HS-ETS1-4)

ETS1.C: Optimizing the Design Solution

- Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (HS-ETS1-2)

Crosscutting Concepts

Systems and System Models

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows— within and between systems at different scales. (HS-ETS1-4)

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

- New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (HS-ETS1-1) (HS-ETS1-3)

Connections to HS-ETS1.A: Defining and Delimiting Engineering Problems include:
Physical Science: HS-PS2-3, HS-PS3-3
Connections to HS-ETS1.B: Designing Solutions to Engineering Problems include:
Earth and Space Science: HS-ESS3-2, HS-ESS3-4, **Life Science:** HS-LS2-7, HS-LS4-6
Connections to HS-ETS1.C: Optimizing the Design Solution include:
Physical Science: HS-PS1-6, HS-PS2-3

Articulation of DCIs across grade-bands: **MS.ETS1.A** (HS-ETS1-1),(HS-ETS1-2),(HS-ETS1-3),(HS-ETS1-4); **MS.ETS1.B** (HS-ETS1-2),(HS-ETS1-3),(HS-ETS1-4); **MS.ETS1.C** (HS-ETS1-2),(HS-ETS1-4)

Common Core State Standards Connections:

ELA/Literacy –

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-ETS1-1),*(HS-ETS1-3)*

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. *(HS-ETS1-1),*(HS-ETS1-3)

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (HS-ETS1-1),*(HS-ETS1-3)*

Mathematics –

MP.2 Reason abstractly and quantitatively. (HS-ETS1-1),*(HS-ETS1-3),(HS-ETS1-4)*

MP.4 Model with mathematics. (HS-ETS1-1),(HS-ETS1-2),(HS-ETS1-3),(HS-ETS1-4)

HS.Earth's Systems

HS.Earth's Systems

Students who demonstrate understanding can:

HS-ESS2-2. **Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.** [Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.]

HS-ESS2-3. **Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.** [Clarification Statement: Emphasis is on both a one-dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth's three-dimensional structure obtained from seismic waves, records of the rate of change of Earth's magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth's layers from high-pressure laboratory experiments.]

HS-ESS2-5. **Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.** [Clarification Statement: Emphasis is on mechanical and chemical investigations with water and a variety of solid materials to provide the evidence for connections between the hydrologic cycle and system interactions commonly known as the rock cycle. Examples of mechanical investigations include stream transportation and deposition using a stream table, erosion using variations in soil moisture content, or frost wedging by the expansion of water as it freezes. Examples of chemical investigations include chemical weathering and recrystallization (by testing the solubility of different materials) or melt generation (by examining how water lowers the melting temperature of most solids).]

HS-ESS2-6. **Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.** [Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere (including humans), providing the foundation for living organisms.]

HS-ESS2-7. **Construct an argument based on evidence about the simultaneous coevolution of Earth systems and life on Earth.** [Clarification Statement: Emphasis is on the dynamic causes, effects, and feedbacks between the biosphere and Earth's other systems, whereby geoscience factors control the evolution of life, which in turn continuously alters Earth's surface. Examples of include how photosynthetic life altered the atmosphere through the production of oxygen, which in turn increased weathering rates and allowed for the evolution of animal life; how microbial life on land increased the formation of soil, which in turn allowed for the evolution of land plants; or how the evolution of corals created reefs that altered patterns of erosion and deposition along coastlines and provided habitats for the evolution of new life forms.] [Assessment Boundary: Assessment does not include a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth's other systems.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).

- Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-ESS2-3),(HS-ESS2-6)

Planning and Carrying Out Investigations

Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

- Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-ESS2-5)

Analyzing and Interpreting Data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (HS-ESS2-2)

Engaging in Argument from Evidence

Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.

- Construct an oral and written argument or counter-arguments based on data and evidence. (HS-ESS2-7)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based on empirical evidence. (HS-ESS2-3)
- Science disciplines share common rules of evidence used to evaluate explanations about natural systems. (HS-ESS2-3)
- Science includes the process of coordinating patterns of evidence with current theory. (HS-ESS2-3)

Disciplinary Core Ideas

ESS2.A: Earth Materials and Systems

- Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes (HS-ESS2-2)
- Evidence from deep probes and seismic waves, reconstructions of historical changes in Earth's surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a solid mantle and crust. Motions of the mantle and its plates occur primarily through thermal convection, which involves the cycling of matter due to the outward flow of energy from Earth's interior and gravitational movement of denser materials toward the interior. (HS-ESS2-3)

ESS2.B: Plate Tectonics and Large-Scale System Interactions

- The radioactive decay of unstable isotopes continually generates new energy within Earth's crust and mantle, providing the primary source of the heat that drives mantle convection. Plate tectonics can be viewed as the surface expression of mantle convection. (HS-ESS2-3)

ESS2.C: The Roles of Water in Earth's Surface Processes

- The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks. (HS-ESS2-5)

ESS2.D: Weather and Climate

- The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. (HS-ESS2-2)
- Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. (HS-ESS2-6),(HS-ESS2-7)
- Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (HS-ESS2-6)

ESS2.E: Biogeology

- The many dynamic and delicate feedbacks between the biosphere and other Earth systems cause a continual co-evolution of Earth's surface and the life that exists on it. (HS-ESS2-7)

PS4.A: Wave Properties

Geologists use seismic waves and their reflection at interfaces between layers to probe structures deep in the planet. *(secondary to HS-ESS2-3)*

Crosscutting Concepts

Energy and Matter

- The total amount of energy and matter in closed systems is conserved. (HS-ESS2-6)
- Energy drives the cycling of matter within and between systems. (HS-ESS2-3)

Structure and Function

- The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. (HS-ESS2-5)

Stability and Change

- Much of science deals with constructing explanations of how things change and how they remain stable. (HS-ESS2-7)
- Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (HS-ESS2-1)
- Feedback (negative or positive) can stabilize or destabilize a system. (HS-ESS2-2)

Connections to Engineering, Technolog and Applications of Science

Interdependence of Science, Engineering, and Technology

- Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (HS-ESS2-3)

Influence of Engineering, Technology, and Science on Society and the Natural World

- New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (HS-ESS2-2)

Connections to other DCIs in this grade-band: **HS.PS1.A** (HS-ESS2-5),(HS-ESS2-6); **HS.PS1.B** (HS-ESS2-5),(HS-ESS2-6); **HS.PS2.B** (HS-ESS2-3); **HS.PS3.B** (HS-ESS2-3),(HS-ESS2-

HS.Weather and Climate

HS.Weather and Climate

Students who demonstrate understanding can:

HS-ESS2-4. **Use a model to describe how variations in the flow of energy into and out of Earth systems result in changes in climate.** [Clarification Statement: Examples of the causes of climate change differ by timescale, over 1-10 years: large volcanic eruption, ocean circulation; 10-100s of years: changes in human activity, ocean circulation, solar output; 10-100s of thousands of years: changes to Earth's orbit and the orientation of its axis; and 10-100s of millions of years: long-term changes in atmospheric composition.] [Assessment Boundary: Assessment of the results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.]

HS-ESS3-5. **Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.** [Clarification Statement: Examples of evidence, for both data and climate model outputs, are for climate changes (such as precipitation and temperature) and their associated impacts (such as on sea level, glacial ice volumes, or atmosphere and ocean composition).] [Assessment Boundary: Assessment is limited to one example of a climate change and its associated impacts.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).

- Use a model to provide mechanistic accounts of phenomena. (HS-ESS2-4)

Analyzing and Interpreting Data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using computational models in order to make valid and reliable scientific claims. (HS-ESS3-5)

Connections to Nature of Science

Scientific Investigations Use a Variety of Methods

- Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (HS-ESS3-5)
- New technologies advance scientific knowledge. (HS-ESS3-5)

Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based on empirical evidence. (HS-ESS3-5)
- Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (HS-ESS2-4), (HS-ESS3-5)

Disciplinary Core Ideas

ESS1.B: Earth and the Solar System

- Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. *(secondary to HS-ESS2-4)*

ESS2.A: Earth Materials and Systems

- The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles. (HS-ESS2-4)

ESS2.D: Weather and Climate

- The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. (HS-ESS2-4),*(secondary to HS-ESS2-2)*
- Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (HS-ESS2-4)

ESS3.D: Global Climate Change

- Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. (HS-ESS3-5)

Crosscutting Concepts

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-ESS2-4)

Stability and Change

- Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (HS-ESS3-5)

Connections to other DCIs in this grade-band: **HS.PS3.A** (HS-ESS2-4); **HS.PS3.B** (HS-ESS3-5); **HS.PS3.D** (HS-ESS3-5); **HS.PS4.B** (HS-ESS2-4); **HS.LS1.C** (HS-ESS3-5); **HS.LS2.C** (HS-ESS2-4); **HS.ESS1.C** (HS-ESS2-4); **HS.ESS2.D** (HS-ESS3-5); **HS.ESS3.C** (HS-ESS2-4); **HS.ESS3.D** (HS-ESS2-4)

Articulation of DCIs across grade-bands: **MS.PS3.A** (HS-ESS2-4); **MS.PS3.B** (HS-ESS2-4),(HS-ESS3-5); **MS.PS3.D** (HS-ESS2-4),(HS-ESS3-5); **MS.PS4.B** (HS-ESS2-4); **MS.LS1.C** (HS-ESS2-4); **MS.LS2.B** (HS-ESS2-4); **MS.LS2.C** (HS-ESS2-4); **MS.ESS2.A** (HS-ESS2-4),(HS-ESS3-5); **MS.ESS2.B** (HS-ESS2-4); **MS.ESS2.C** (HS-ESS2-4); **MS.ESS2.D** (HS-ESS2-4),(HS-ESS3-5); **MS.ESS3.B** (HS-ESS3-5); **MS.ESS3.C** (HS-ESS2-4), (HS-ESS3-5); **MS.ESS3.D** (HS-ESS2-4),(HS-ESS3-5)

Common Core State Standards Connections:

ELA/Literacy –

RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-ESS3-5)
RST.11-12.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. *(HS-ESS3-5)*
RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-ESS3-5)
SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-ESS2-4)*

Mathematics –

MP.2	Reason abstractly and quantitatively.(HS-ESS2-4),(HS-ESS3-5)
MP.4	Model with mathematics. (HS-ESS2-4)
HSN-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-ESS2-4),(HS-ESS3-5)
HSN-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS2-4),*(HS-ESS3-5)*
HSN-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS2-4),(HS-ESS3-5)

HS.Human Impacts

HS.Human Impacts

Students who demonstrate understanding can:

HS-ESS3-1. **Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.** [Clarification Statement: Examples of key natural resources include access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards can be from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting and soil erosion), and severe weather (such as hurricanes, floods, and droughts). Examples of the results of changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.]

HS-ESS3-2. **Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.*** [Clarification Statement: Emphasis is on the conservation, recycling, and reuse of resources (such as minerals and metals) where possible, and on minimizing impacts where it is not. Examples include developing best practices for agricultural soil use, mining (for coal, tar sands, and oil shales), and pumping (for petroleum and natural gas). Science knowledge indicates what can happen in natural systems—not what should happen.]

HS-ESS3-3. **Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.** [Clarification Statement: Examples of factors that affect the management of natural resources include costs of resource extraction and waste management, per-capita consumption, and the development of new technologies. Examples of factors that affect human sustainability include agricultural efficiency, levels of conservation, and urban planning.] [Assessment Boundary: Assessment for computational simulations is limited to using provided multi-parameter programs or constructing simplified spreadsheet calculations.]

HS-ESS3-4. **Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.*** [Clarification Statement: Examples of data on the impacts of human activities could include the quantities and types of pollutants released, changes to biomass and species diversity, or areal changes in land surface use (such as for urban development, agriculture and livestock, or surface mining). Examples for limiting future impacts could range from local efforts (such as reducing, reusing, and recycling resources) to large-scale geoengineering design solutions (such as altering global temperatures by making large changes to the atmosphere or ocean).]

HS-ESS3-6. **Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.*** [Clarification Statement: Examples of Earth systems to be considered are the hydrosphere, atmosphere, cryosphere, geosphere, and/or biosphere. An example of the far-reaching impacts from a human activity is how an increase in atmospheric carbon dioxide results in an increase in photosynthetic biomass on land and an increase in ocean acidification, with resulting impacts on sea organism health and marine populations.] [Assessment Boundary: Assessment does not include running computational representations but is limited to using the published results of scientific computational models.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Create a computational model or simulation of a phenomenon, designed device, process, or system. (HS-ESS3-3)
- Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations. (HS-ESS3-6)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific knowledge, principles, and theories.

- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-ESS3-1)
- Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-ESS3-4)

Engaging in Argument from Evidence
Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.

- Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding

Disciplinary Core Ideas

ESS2.D: Weather and Climate

- Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere. *(secondary to HS-ESS3-6)*

ESS3.A: Natural Resources

- Resource availability has guided the development of human society. (HS-ESS3-1)
- All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors. (HS-ESS3-2)

ESS3.B: Natural Hazards

- Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations. (HS-ESS3-1)

ESS3.C: Human Impacts on Earth Systems

- The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. (HS-ESS3-3)
- Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. (HS-ESS3-4)

ESS3.D: Global Climate Change

- Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities. (HS-ESS3-6)

ETS1.B. Designing Solutions to Engineering Problems

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. *(secondary to HS-ESS3-2),(secondary to HS-ESS3-4)*

Crosscutting Concepts

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-ESS3-1)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (HS-ESS3-6)

Stability and Change

- Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (HS-ESS3-3)
- Feedback (negative or positive) can stabilize or destabilize a system. (HS-ESS3-4)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Modern civilization depends on major technological systems. (HS-ESS3-1),(HS-ESS3-3)
- Engineers continuously modify these systems to increase benefits while decreasing costs and risks. (HS-ESS3-2),(HS-ESS3-4)
- New technologies can have deep impacts on society and the environment, including some that were not anticipated. (HS-ESS3-3)
- Analysis of costs and benefits is a critical aspect of decisions about technology. (HS-ESS3-2)

relevant factors (e.g. economic, societal, environmental, ethical considerations). (HS-ESS3-2) **----------** ***Connections to Nature of Science*** **Scientific Investigations Use a Variety of Methods** ▪ Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (HS-ESS3-5) ▪ New technologies advance scientific knowledge. (HS-ESS3-5) ▪ Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (HS-ESS3-5) ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (HS-ESS3-5)		**----------** ***Connections to Nature of Science*** **Science is a Human Endeavor** ▪ Scientific knowledge is a result of human endeavors, imagination, and creativity. (HS-ESS3-3) **Science Addresses Questions About the Natural and Material World** ▪ Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions. (HS-ESS3-2) ▪ Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge. (HS-ESS3-2) ▪ Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues. (HS-ESS3-2)

Connections to other DCIs in this grade-band: **HS.PS1.B** (HS-ESS3-3); **HS.PS3.B** (HS-ESS3-2); **HS.PS3.D** (HS-ESS3-2); **HS.LS2.A** (HS-ESS3-2),(HS-ESS3-3); **HS.LS2.B** (HS-ESS3-2),(HS-ESS3-3),(HS-ESS3-6); **HS.LS2.C** (HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-6); **HS.LS4.D** (HS-ESS3-2),(HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-6); **HS.ESS2.A** (HS-ESS3-2),(HS-ESS3-3),(HS-ESS3-6); **HS.ESS2.E** (HS-ESS3-3)

Articulation of DCIs across grade-bands: **MS.PS1.B** (HS-ESS3-3); **MS.PS3.D** (HS-ESS3-2); **MS.LS2.A** (HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-3); **MS.LS2.B** (HS-ESS3-2),(HS-ESS3-3); **MS.LS2.C** (HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-6); **MS.LS4.C** (HS-ESS3-3); **MS.LS4.D** (HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-3); **MS.ESS2.A** (HS-ESS3-1),(HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-6); **MS.ESS2.C** (HS-ESS3-6); **MS.ESS2.E** (HS-ESS3-3),(HS-ESS3-4); **MS.ESS3.A** (HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-3); **MS.ESS3.B** (HS-ESS3-1),(HS-ESS3-4); **MS.ESS3.C** (HS-ESS3-2),(HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-6); **MS.ESS3.D** (HS-ESS3-4),(HS-ESS3-6)

Common Core State Standards Connections:

ELA/Literacy –

RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-ESS3-1),*(HS-ESS3-2),(HS-ESS3-4)
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ESS3-2),(HS-ESS3-4)
WHST.9-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-ESS3-1)

Mathematics –

MP.2	Reason abstractly and quantitatively. *(HS-ESS3-1),*(HS-ESS3-2),(HS-ESS3-3),*(HS-ESS3-4),*(HS-ESS3-6)
MP.4	Model with mathematics. (HS-ESS3-3),(HS-ESS3-6)
HSN-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. *(HS-ESS3-1),*(HS-ESS3-4),(HS-ESS3-6)
HSN-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. *(HS-ESS3-1),(HS-ESS3-4),*(HS-ESS3-6)
HSN-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. *(HS-ESS3-1),(HS-ESS3-4),*(HS-ESS3-6)

Appendix 4: IB & PLTW Course Descriptions from published literature

International Baccalaureate Diploma Programme Subject Brief

Studies in language and literature:
English A: Language and literature – Higher level

First assessments 2013 – Last assessments 2020

The IB Diploma Programme (DP) is a rigorous, academically challenging and balanced programme of education designed to prepare students aged 16 to 19 for success at university and life beyond. The DP aims to encourage students to be knowledgeable, inquiring, caring and compassionate, and to develop intercultural understanding, open-mindedness and the attitudes necessary to respect and evaluate a range of viewpoints.

To ensure both breadth and depth of knowledge and understanding, students must choose at least one subject from five groups: 1) their best language, 2) additional language(s), 3) social sciences, 4) experimental sciences, and 5) mathematics. Students may choose either an arts subject from group 6, or a second subject from groups 1 to 5. At least three and not more than four subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.

These IB DP subject briefs illustrate four key course components.
I. Course description and aims
II. Curriculum model overview
III. Assessment model
IV. Sample questions

I. Course description and aims

The language A: language and literature course aims to develop skills of textual analysis and the understanding that texts, both literary and non-literary, can relate to culturally determined reading practices. The course also encourages students to question the meaning generated by language and texts. An understanding of the ways in which formal elements are used to create meaning in a text is combined with an exploration of how that meaning is affected by reading practices that are culturally defined and by the circumstances of production and reception. The study of literature in translation from other cultures is especially important to IB DP students because it contributes to a global perspective. Texts are chosen from a variety of sources, genres and media.

The aims of language A: language and literature higher level courses are to:

- introduce students to a range of texts from different periods, styles and genres
- develop in students the ability to engage in close, detailed analysis of individual texts and make relevant connections
- develop the students' powers of expression, both in oral and written communication
- encourage students to recognize the importance of the contexts in which texts are written and received
- encourage an appreciation of the different perspectives of other cultures, and how these perspectives construct meaning
- encourage students to appreciate the formal, stylistic and aesthetic qualities of texts
- promote in students an enjoyment of, and lifelong interest in, language and literature
- develop in students an understanding of how language, culture and context determine the ways in which meaning is constructed in texts
- encourage students to think critically about the different interactions between text, audience and purpose.

II. Curriculum model overview

Component	Recommended teaching hours
Part 1: Language in cultural context • effect of audience and purpose on the structure and content of texts • impact of language changes • effect of culture and context on language and meaning	60
Part 2: Language and mass communication • forms of communication within the media • educational, political or ideological influence of the media • ways in which mass media use language and image to inform, persuade or entertain	60

Part 3: Literature—texts and contexts • historical, cultural and social contexts in which texts are written and received • relationship between context and formal elements of the text, genre and structure • attitudes and values expressed by literary texts and their impact on readers	70
Part 4: Literature—critical study • detailed exploration of literary works • elements such as theme and the ethical stance or moral values of literary texts • appropriate use of literary terms	50

III. Assessment model

Having followed the language and literature higher level course, students will be expected to demonstrate the following.

Knowledge and understanding
- knowledge and understanding of a range of texts
- understanding of the use of language, structure, technique and style
- critical understanding of the ways in which readers construct meaning and the influence of context
- understanding of how different perspectives influence the reading of a text

Application and analysis
- ability to choose a text type appropriate to the purpose required
- ability to use terminology relevant to the various text types studied
- ability to analyse the effects of language, structure, technique and style on the reader
- awareness of the ways in which the production and reception of texts contribute to their meanings
- ability to substantiate and justify ideas with relevant examples

Synthesis and evaluation
- ability to compare and contrast the formal elements, content and context of texts
- ability to discuss the ways in which language and image may be used in a range of texts
- ability to evaluate conflicting viewpoints within and about a text
- ability to produce a critical response evaluating some aspects of text, context and meaning

Selection and use of appropriate presentation and language skills
- ability to express ideas clearly and with fluency, both written and orally
- ability to use the oral and written forms of the language, in a range of styles, registers and situations
- ability to discuss and analyse texts in a focused and logical manner
- ability to write a balanced, comparative analysis

Assessment at a glance

Type of assessment	Format of assessment	Time (hours)	Weighting of final grade (%)
External		4	70
Paper 1	A written comparative analysis of one pair of unseen texts.	2	25
Paper 2	In response to one of six questions, an essay based on at least two texts studied.	2	25
Written Tasks	At least four written tasks based on course material, two for external assessment.		20
Internal			30
Individual oral commentary	An oral commentary on an extract from a literary text studied; two guiding questions are given.		15
Further oral activity	At least two further oral activities. The mark of one is submitted for final assessment.		15

IV. Sample questions

- Writers often use a character who is alienated from his or her culture or society in order to explore cultural or social values. Examine this idea with reference to at least two works studied.
- It has been said that history "cannot be unlived, but if faced with courage, need not be lived again." To what extent do at least two works studied "face" history in order to ensure that its wrongs "need not be lived again"?

International Baccalaureate
Diploma Programme Subject Brief

Mathematics:
Mathematics – Higher level

First assessments 2014 – Last assessments 2020

The IB Diploma Programme (DP) is a rigorous, academically challenging and balanced programme of education designed to prepare students aged 16 to 19 for success at university and life beyond. The DP aims to encourage students to be knowledgeable, inquiring, caring and compassionate, and to develop intercultural understanding, open-mindedness and the attitudes necessary to respect and evaluate a range of viewpoints.

To ensure both breadth and depth of knowledge and understanding, students must choose at least one subject from five groups: 1) their best language, 2) additional language(s), 3) social sciences, 4) experimental sciences, and 5) mathematics. Students may choose either an arts subject from group 6, or a second subject from groups 1 to 5. At least three and not more than four subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.

These IB DP subject briefs illustrate four key course components.
I. Course description and aims
II. Curriculum model overview
III. Assessment model
IV. Sample questions

I. Course description and aims

The IB DP higher level mathematics course focuses on developing important mathematical concepts in a comprehensible, coherent and rigorous way, achieved by a carefully balanced approach. Students are encouraged to apply their mathematical knowledge to solve problems set in a variety of meaningful contexts. Development of each topic should feature justification and proof of results. Students should expect to develop insight into mathematical form and structure, and should be intellectually equipped to appreciate the links between concepts in different topic areas. They are also encouraged to develop the skills needed to continue their mathematical growth in other learning environments. The internally assessed exploration allows students to develop independence in mathematical learning. Students are encouraged to take a considered approach to various mathematical activities and to explore different mathematical ideas. The exploration also allows students to work without the time constraints of a written examination and to develop the skills they need for communicating mathematical ideas.

The aims of all mathematics courses in group 5 are to enable students to:

- enjoy and develop an appreciation of the elegance and power of mathematics
- develop an understanding of the principles and nature of mathematics
- communicate clearly and confidently in a variety of contexts
- develop logical, critical and creative thinking, and patience and persistence in problem-solving
- employ and refine their powers of abstraction and generalization
- apply and transfer skills to alternative situations, to other areas of knowledge and to future developments
- appreciate how developments in technology and mathematics have influenced each other
- appreciate the moral, social and ethical implications arising from the work of mathematicians and the applications of mathematics
- appreciate the international dimension in mathematics through an awareness of the universality of mathematics and its multicultural and historical perspectives
- appreciate the contribution of mathematics to other disciplines, and as a particular "area of knowledge" in the TOK course.

II. Curriculum model overview

Component	Recommended teaching hours
Topic 1 Algebra	30
Topic 2 Functions and equations	22
Topic 3 Circular functions and trigonometry	22
Topic 4 Vectors	24
Topic 5 Statistics and probability	36
Topic 6 Calculus	48

Option syllabus content Students must study one of the following options. ***Topic 7*** Statistics and probability ***Topic 8*** Sets, relations and groups ***Topic 9*** Calculus ***Topic 10*** Discrete mathematics	48
Mathematical exploration A piece of individual written work that involves investigating an area of mathematics.	10

III. Assessment model

Having followed the mathematics higher level course, students will be expected to demonstrate the following:

- Knowledge and understanding: recall, select and use knowledge of mathematical facts, concepts and techniques in a variety of familiar and unfamiliar contexts.
- Problem-solving: recall, select and use their knowledge of mathematical skills, results and models in both real and abstract contexts to solve problems.
- Communication and interpretation: transform common realistic contexts into mathematics; comment on the context; sketch or draw mathematical diagrams, graphs or constructions both on paper and using technology; record methods, solutions and conclusions using standardized notation.
- Technology: use technology, accurately, appropriately and efficiently both to explore new ideas and to solve problems.
- Reasoning: construct mathematical arguments through use of precise statements, logical deduction and inference, and by the manipulation of mathematical expressions.
- Inquiry approaches: investigate unfamiliar situations, both abstract and real-world, involving organizing and analysing information, making conjectures, drawing conclusions and testing their validity.

Assessment at a glance

Type of assessment	Format of assessment	Time (hours)	Weighting of final grade (%)
External		5	80
Paper 1 (non-calculator)	Section A: Compulsory short-response questions based on the core syllabus. Section B: Compulsory extended-response questions based on the core syllabus.	2	30
Paper 2 (graphical display calculator required)	Section A: Compulsory short-response questions based on the core syllabus. Section B: Compulsory extended-response questions based on the core syllabus.	2	30
Paper 3 (graphical display calculator required)	Compulsory extended-response questions based mainly on the syllabus options.	1	20
Internal			20
Mathematical exploration	The individual exploration is a piece of written work that involves investigating an area of mathematics.		

IV. Sample questions

- The vectors a, b, c satisfy the equation a+b+c=0. Show that axb=bxc=cxa.
- Consider the following system of equations:

  $x + y + z = 1$
  $2x + 3y + z = 3$
  $x + 3y - z = \lambda$

  where $\lambda \in R$.

  A. Show that this system does not have a unique solution for any value of λ.

  B. i. Determine the value of λ for which the system is consistent.
  ii. For this value of λ, find the general solution of the system.

About the IB: For over 40 years the IB has built a reputation for high-quality, challenging programmes of education that develop internationally minded young people who are well prepared for the challenges of life in the 21st century and able to contribute to creating a better, more peaceful world.

For further information on the IB Diploma Programme, visit: ***http://www.ibo.org/diploma/*** *Complete subject guides can be accessed through the IB Online Curriculum Center (OCC), the IB university and government official system, or purchased through the IB store:* ***http://store.ibo.org***

To learn more about how the IB Diploma Programme prepares students for success at university, visit: ***www.ibo.org/recognition*** *or email:* ***recognition@ibo.org***

IB Subject Briefs retrieved from http://www.ibo.org/university-admission/ib-recognition-resources-and-document-library/#briefs

IB Career Program Core

The Core requirements for the IB Career Program consist of the following, which require a total of 180 hours of teacher-student contact time over the two year course of study (90 hours for personal and professional skills, 50 hours language development, 40 hours for the reflective project, and 50 hours service learning.

> "The ***personal and professional skills*** course aims to develop responsibility, practical problem-solving, good intellectual habits, ethical understanding, perseverance, resilience, an appreciation of identity and perspective and an understanding of the complexity of the modern world. Emphasis is placed on the development of skills needed to successfully navigate higher education, the workplace and society.
>
> ***Service learning*** is the practical application of knowledge and skills toward meeting an identi ed community need. Through service, students develop and apply personal and social skills in real-life situations involving decision-making, problem-solving, initiative, responsibility and accountability for their actions.
>
> ***Language development*** ensures that all CP students have access and exposure to a second language. The opportunity to learn a second language is a central tenet of an IB education and increases students' understanding of the wider world. Students are encouraged to begin or extend the study of an additional language that suits their needs, backgrounds and contexts. It develops students' oral, visual and written linguistic and communicative abilities.
>
> The ***reflective project*** is an in-depth body of work produced over an extended period and submitted toward the end of the program. Through the reflective project, students identify, analyze, discuss and evaluate an ethical dilemma associated with an issue from their career-related studies. This work encourages students to engage in personal inquiry, intellectual discovery, creativity, action and reflection, and to develop strong thinking, research and communications skills." (IB, 2015).

PLTW Biomedical Science Curriculum

Foundation Courses

PBS **Principles of Biomedical Science** *1 year*

In the introductory course of the PLTW Biomedical Science program, students explore concepts of biology and medicine to determine factors that led to the death of a fictional person. While investigating the case, students examine autopsy reports, investigate medical history, and explore medical treatments that might have prolonged the person's life. The activities and projects introduce students to human physiology, basic biology, medicine, and research processes while allowing them to design their own experiments to solve problems.

HBS **Human Body Systems** *1 year*

Students examine the interactions of human body systems as they explore identity, power, movement, protection, and homeostasis. Exploring science in action, students build organs and tissues on MANIKEN® skeletal models; use data acquisition software to monitor body functions, such as muscle movement, reflex and voluntary action, and respiration; and take on the roles of biomedical professionals to solve real-world medical cases.

MI **Medical Interventions** *1 year*

Students follow the life of a fictitious family as they investigate how to prevent, diagnose, and treat disease. Students explore how to detect and fight infection; screen and evaluate the code in human DNA; evaluate cancer treatment options; and prevail when the organs of the body begin to fail. Through cases, students learn about a range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics.

Capstone Course

BI **Biomedical Innovation** *1 year*

In the final course of the PLTW Biomedical Science sequence, students build on the knowledge and skills gained from previous courses to design innovative solutions for the most pressing health challenges of the 21st century. Students address topics ranging from public health and biomedical engineering to clinical medicine and physiology. They have the opportunity to work on an independent research project with a mentor or advisor from a university, medical facility, or research institution.

Retrieved from https://www.pltw.org/our-programs/pltw-biomedical-science/pltw-biomedical-science-curriculum

PLTW Computer Science Curriculum

Introductory Course

ICS **Introduction to Computer Science** *0.5 years** — Available in 2015-16

ICS is designed to be the first computer science course for students who have never written code. Students create apps for mobile devices, explore the impact of computing in society, and learn how computing applies in various career fields.

Foundation Courses

CSE **Computer Science and Software Engineering** *1 year^* — Available Now!

This course aims to develop computational thinking, generate excitement about career paths that incorporate computing, and introduce professional tools that foster creativity and collaboration.

CSA **Computer Science Applications** *1 year~* — Available in 2016-17

In CSA, students collaborate to integrate technologies across multiple platforms, mobile devices, and networks.

Specialization Courses

SAM **Simulation and Modeling** *0.5 years~* — Available in 2017-18

Students create models and run simulations to communicate central ideas in the physical, biological, and social sciences and deepen their understanding of concepts in discrete math and computer science.

AI **Artificial Intelligence** *0.5 years~* — Available in 2018-19

Students develop artificially intelligent systems that generate solutions to real problems found in science and industry and use a wide array of applications, including automated vehicles and computer vision.

SEC **Cybersecurity** *0.5 years~* — Available in 2018-19

This course introduces the tools and concepts of cybersecurity and encourages students to develop solutions that allow people to share computing resources while protecting privacy. SEC raises students' knowledge of and commitment to ethical computing behavior.

Capstone Course

CPS **Computational Problem Solving** *1 year~* — Available in 2018-19

Students get the opportunity to work in a team to deliver a software solution to a real-world design problem. Throughout the project, students apply effective practices in problem solving, documentation, software development, and presentation.

**Course aligns with CSTA 3A standards. ^Course aligns with CSTA 3B standards. ~Course aligns with CSTA.*

Retrieved from https://www.pltw.org/our-programs/pltw-computer-science

Appendix 5: Outline of Global Issues Seminar and Capstone

"*Globalization of economies, the digital revolution, mass migration, and the prospect of climate instability are triggering new concerns and demanding a new kind of graduate …To succeed in this new global age, our students … will need to be far more knowledgeable and curious about world regions and global issues, attuned to diverse perspectives, able to communicate across cultures and in other languages, and disposed to acting toward the common good*" (Boix-Mansilla and Jackson, 2013, p.2). To the issues identified here, we have to add the increasing intolerance among people of different cultures, as well as increasing geo-political tensions. The world is becoming Hot, Connected and Embattled.

The Senior Seminar curriculum described here is designed for TechIndy. This seminar is designed to build on the science and engineering pathways that students will have engaged with, as well as other school efforts to build global competence. It is planned as a culminating experience where students consolidate and extend their knowledge of global issues and take action, using technology, to create positive change. It is expected that the seminar will run over two 14-week semester sessions, with two 45-minute lessons per week. The full curriculum will be collaboratively developed at the school, and this document provides preliminary sample lesson plans that will be adapted by the teaching faculty.

The curriculum is divided into the following modules:

- The World in the Last Fifty Years: Historical, political and economical context of the world today
- Pluralism and a cosmopolitan ethic
- The challenge of poverty and international development
- Sustainable human presence
- Harnessing technology for positive change

The generative topic for the course is "How can we use science, technology and the arts to bring hope and equity at home and around the world?" This functions as a through-line for the course, and understanding goals for each module are shown in the table below.

Module	Understanding Goals
Historical, political and economical context of the world today	Students will understand the forces behind the major changes in global political and economic positions of nations and blocs since the 1960s. Students will develop an understanding of the major changes in electronics technology, computing, communications and biotechnology and how these have led to globalization. Students will gain a basic understanding of the major challenges facing the world today.
Pluralism and a cosmopolitan ethic	Students will understand the changes in demographics of major groups of people in the United States and in the world, as well as the role of economic and political forces in migration. Students will begin to develop a mutual understanding and respect with people of different cultures, religions, race and class and begin to develop the values of pluralism and a "cosmopolitan ethic."
The challenge of poverty and international development	Students will understand the multi-dimensional nature of poverty, geographies where poverty exists, and the theories for alleviating poverty. Students will develop empathy and compassion for people living in poverty and will take continued action towards reducing poverty. Students will understand the Millenium Development Goals and the progress made against them in the last fifty years. They will understand the new Sustainable Development Goals and what needs to be done to achieve them.
Sustainable human presence	Students will understand the science of climate change and the effects on the earth of continued increases in greenhouse gasses. Students will understand the extent of environmental degradation taking place in the world today, including the effect of plastic on the environment, deforestation, the reduction of fresh water, etc. Students will understand what actions they can take to preserve the environment and reduce increases in carbon emissions.
Harnessing technology for positive change	Students will understand how to use social media to mobilize people for social change. Students will understand how to use mobile technologies to create innovative solutions for the challenges of the world today. Students will understand how to develop innovations using various technologies for the problems of climate change and poverty.

Appendix 6: Sample Unit Plans

6A: An interdisciplinary unit for Grade 9 integrating[14] Biology, Public Health and Movement

Multi-faceted Unit Question		
The Beast Within: How can an effective public health campaign be designed using movement and dance to convey the workings, impact and containment of virus-borne diseases in today's world?		
Integrative Understandings		
1) How do individuals and communities experience the effects and impact of virus-borne disease; 2) How can movement/dance be used for social mobilization, particularly for public-health campaigns		
Disciplinary Knowledge		
Biology	**Public Health**	**Movement/Dance**
What are the structures of cells and viruses and how do viruses cause disease?	What are some prominent virus-borne diseases and their impacts on humans and societies	How do ideas get communicated through dance? How do personal experiences influence the interpretation of a dance?
What metabolic and circulatory factors affect how a virus spreads?	What are some historical epidemics/pandemics and what were their impacts on human societies?	How do choreographers manipulate and develop basic movement in a dance?
What is the body's immune response and why does it fail to respond to certain viruses? How do vaccines work?	How do viruses spread in a community and across national boundaries?	How does an artist choreograph or improvise dance that exhibits coherence and aesthetic beauty?
What is the human experience of disease?	What are the methods of prevention and precaution used by public health authorities?	How does dance/ movement communicate social, cultural or abstract themes?
Disciplinary Methods		
Make observations, raise questions, and formulate hypotheses	Community health assessment	Basic movements and dance and how they can be used to represent ideas and concepts
Design and conduct scientific investigations	Inform, educate and empower people about health issues	Communicating meaning through choreography
Analyze and interpret results of scientific investigations	Responding to public health emergencies	Interpret complex ideas through improvisation and choreographed phrases
Communicate and apply the	Research for new insights and	

[14] Unit plan developed by Mahmoud Sayani and Ana Novak for AH201A Interdisciplinary Education course at Harvard GSE

results of scientific investigations	innovative solutions to health problems.	
Performances of Understanding (Disciplinary)		
Biology	**Public Health**	**Movement/Dance**
Research and report on the differences between viruses and how they affect the body Explore and report on one public figure or community that has been affected by one of these viruses and discuss elements of their personal experience	Written/photo/video essay on causes and public health response to one viral epidemic in the last fifty years	Explore and choreograph a piece using the elements of dance (time, space, energy) Create a List Dance, Phrase Dance, Process and Cycle Dance, and Design a Score Choreograph a dance piece that explores a personal narrative through aesthetic interpretation
Performances of Understanding (Integrated)		
Initial	**Midway Synthesis**	**Culminating**
Represent, through movement, structures of cells and viruses and how viruses cause disease Memo on how the Traffic Mimes in Bogota used movement to convey messages to the public	Use movement to convey spread of disease through an individual/community Use movement to express the personal experience of disease	Develop and perform a public health message conveying the transmission and prevention of a specific viral-borne disease. Reflection – how has movement been helpful in understanding the cause & effect of disease and as a means of conveying public health messages

Assessment Framework

	Disciplinary Grounding	**Evidence of advancement**	**Critical awareness of choices made**
Initial Synthesis	Should show accuracy in cell & virus structures and circulation through body (*Biology),* the use of movement to represent ideas and choreography to connect ideas (*Dance)*	Should demonstrate how movement advanced their understanding of biological concepts	Should indicate the choices they made in movement and how these were appropriate in representing the biological knowledge.
Midway synthesis	Should show accuracy in knowledge of disease transmission (Biology, Public Health) and consolidation of use of movement.	Should demonstrate how biological knowledge contributed to Public Health and how movement contributed to understanding both disciplines	Should indicate the choices they made and how these were appropriate in representing public health concepts of disease transmission.
Final Synthesis	Should show deep understanding of the knowledge and concepts from all three disciplines	Should demonstrate how knowledge of biology, public health and movement led to development of effective public health messaging	Should indicate the knowledge and methods choices in all three disciplines to create effective social change messaging

6B: An interdisciplinary unit integrating Civil Engineering and Architectural Concepts

Unit Question: What factors do architects consider when designing a bridge?		
Understanding goals: 1. Understand the different types of bridges and their structural elements 2. Understand how architects take aesthetics into account in bridge design 3. Understand how bridges can serve as historical markers and social commentaries on the communities they serve		
Activities	**Performances of Understanding**	**Ongoing Assessment**
Lesson 1: Introduction (1.5 hours)		
1. Whole-group introductory activity – view clip of the Tacoma Narrows Bridge. Discuss with students what they thought happened. Try and get them to think of the forces involved. 2. Introduce the topic and learning objectives. 3. Whole-group watch clip to understand types of bridges https://www.khanacademy.org/partner-content/mit-k12/mit-k12-physics/v/bridge-design-and-destruction-part-2 4. Students will individually look at a prepared set of slides showing bridges from around the US and identify the key structural elements.	1. In small groups, using basic materials such as popsicle sticks, straws and pennies, students will investigate the strength of square and round columns; and the strength of square versus triangular structures for trusses. 2. In small groups, with materials provided each group will build a beam, truss and suspension bridge across two desks in turn. They will test each bridge, with weights made of pennies, to determine strength. When their bridge collapses, the teams will come up with a design to strengthen the bridge and record the results.	1. Each team will submit a report with: a. A scale drawing of each bridge they designed b. A report showing the weight at which their bridge collapsed, and what modifications they made to make it stronger, with any calculations they did. c. Any questions they have about bridge design and how they will investigate these questions.

Activities	**Performances of Understanding**	**Ongoing Assessment**
Lesson 2: Aesthetic design		
Guest speaker: Local architect who can discuss how aesthetic factors are taken into account in bridge design	After the speaker's presentation, students will break into groups, and do a website search of various parts of the world, looking at the aesthetic elements.	Students will deliver a presentation in the last half hour of class of the bridges they looked at and the aesthetic elements of these bridges.
Lesson 3: Field Trip		
Field Trip to local bridges.	Students will deliver a presentation in class in small	Independent research 4-page paper: Research one famous

	groups with pictures of the various structural and aesthetic design elements of the bridges they saw. They will also consider the historical and social circumstances around the building of the bridges.	bridge anywhere in the world (e.g. Golden Gate Bridge, JFK Bridge, Brooklyn Bridge). Discuss the structural and aesthetic design elements and the impact the bridge had on social and economic life of the city after it was built.
Lesson 4-6: Bridge Design Contest		
1. Download the bridge design software at https://bridgecontest.org/resources/download/ 2. Learn how to use the software in small groups 3. In small groups, work through the online tutorials 2,4 and 5 at the bridge contest website.	Groups will make a presentation of the truss bridge they designed following Tutorial 5 from the bridge contest website.	**Culminating project** In groups, students will create a new design in the bridge designer software and will make a final presentation that explains how they designed the bridge, the mathematics involved and the decisions made. They will also present artistic sketches showing aesthetic design elements created.

6C: A lesson from the Global Issues and Capstone Course

Understanding Goal: Students will understand how social media has been used to mobilize people in social movements in recent history

Guided inquiry	Resources/Alignment with Cognitive Science
Introduction (2 minutes) 1. Remind students of what they learnt in the last session, using the concept maps they developed. 2. Discuss the objectives for this lesson and the next 3. Remind them of the norms of working effectively in groups	
Connecting back to prior knowledge and in time (10 min) 1. (2 min) Play an excerpt of the Martin Luther King Speech https://www.youtube.com/watch?v=3vDWWy4CMhE 2. (5 min) Small-group discussion. Ask students to discuss the 1963 March on Washington and the Civil Rights movement. Ask them to use the HRASE method (Latham, 1997) to frame the discussion. a. History: What was the march trying to accomplish? What was the bigger issue behind the Civil Rights movement? Who was affected by the issue? b. Relationships: Who were some of the key leaders of the Civil Rights movement? Who were some people who became symbolic leaders? (Rosa Parks, Ruby Bridges) c. (Connect and) Apply: Connect back to social media campaigns. Were some of the elements of effective social media campaigns present in the March to Washington? d. Speculate: How do you think the organizers of the March to Washington mobilized 200,000 people? e. Explain: What did the movement achieve? 3. (2 min) Large-group share-out.	Using Expansive framing to connect to prior knowledge about the Civil Rights movement  http://hubpages.com/politics/The-Problem-We-All-Live-With---Norman-Rockwell-the-truth-about-his-famous-painting

Connecting two concepts- social movements and social media 1. (25 min). Split the class into small groups. Half the students will study Occupy Wall Street, the other will study the Black Lives Matter movement. a. Occupy Wall Street ○ Watch video (5 min) https://embed.theguardian.com/embed/video/world/video/2012/apr/13/occupy-seven-months-of-protest-video ○ Read article http://www.nytimes.com/2011/11/25/business/media/occ	Castells (2012, p218-237) provides an excellent analysis of the key elements of successful social media movements: 1. "Networked in multiple ways… 2. Occupy an urban space…

upy-movement-focuses-on-staying-current-on-social-networks.html?_r=1 b. Black Lives Matter - Read Web article http://www.wired.com/2015/10/how-black-lives-matter-uses-social-media-to-fight-the-power/ - Read http://www.theguardian.com/world/2015/jul/19/blacklivesmatter-birth-civil-rights-movement - Review the web-site, Facebook page, twitter 2. Ask students to extract the key elements of what made these movements successful. Ask them to think about the elements of a social media campaign, and to go beyond that and think about how they became a movement. As students are working go around the room and coach the groups to make sure they are getting all the points from Castells. 3. Ask student to create a poster, presentation or skit that represents what they learnt about how these movements used social movements to mobilize. 4. (8 min) Large-group share-out. Each group should get 1-2 minutes to present what they created. 5. Closing instructions – ask students to come to the next class having created small groups and having defined an issue they would like to do their project on.	3. Local and global at the same time… 4. Spontaneous in origin, usually marked by spark of indignations … 5. Are viral… 6. Leaderless movements… 7. Highly self-reflective 8. Non-violent… 9. Aimed at changing the values of society" Use case-based reasoning in design a solution to an under-constrained problem (Kolodner, 1992).

Appendix 7: School Climate Survey for Families

When I visit the school, I feel welcome

___ Never/Rarely ____Sometimes __ Always/Almost Always

I am treated with respect at the school

___ Never/Rarely ____Sometimes __ Always/Almost Always

The school respects my cultural heritage

___ Never/Rarely ____Sometimes __ Always/Almost Always

I feel welcome and heard at PTA and School-Site Council Meetings

___ Never/Rarely ____Sometimes __ Always/Almost Always

I have a good working relationship with my child's teachers

___ Never/Rarely ____Sometimes __ Always/Almost Always

I have a good working relationship with my child's Advisor

___ Never/Rarely ____Sometimes __ Always/Almost Always

I can talk to the school leadership when I have a concern and I know I will be heard with respect

___ Never/Rarely ____Sometimes __ Always/Almost Always

The school has a clear process for addressing my concerns

___ Never/Rarely ____Sometimes __ Always/Almost Always

When I need a translator to communicate with the school, the school arranges one

___ Never/Rarely ____Sometimes __ Always/Almost Always

I have opportunities to express my opinion and feel heard before important changes or decisions are made at the school

___ Never/Rarely ____Sometimes __ Always/Almost Always

I am well informed by the school and teachers about how my child is doing in school

___ Never/Rarely ____Sometimes __ Always/Almost Always

My child's teachers/advisor let me know right away if my child is having problems

___ Never/Rarely ____Sometimes __ Always/Almost Always

I understand what my child is supposed to learn in school, as well as the way s/he will be assessed

___ Never/Rarely ____Sometimes __ Always/Almost Always

The school provides useful information about how I can help my child in his/her learning and other developmental needs

___ Never/Rarely ____Sometimes __ Always/Almost Always

Students at this school feel they are challenged and encouraged to do their best and to perform to highest levels

___ Never/Rarely ____Sometimes __ Always/Almost Always

I am very satisfied with the quality of the school

___ Never/Rarely ____Sometimes __ Always/Almost Always

All members of the school exhibit the core values of the school

___ Never/Rarely ____Sometimes __ Always/Almost Always

I would recommend this school to other parents

___ Never/Rarely ____Sometimes __ Always/Almost Always

Please tell us how often you have been contacted by your child's teachers/advisors this semester

____ once ____ twice ____ three times ____ more than three times

Please tell us how often you have been involved in school activities this term

____ once ____ twice ____ three times ____ more than three times

Please tell what you feel the school should do to improve your experience with the school or your child's learning

_____

_____

(Adapted from Henderson et al, 2007)

Appendix 8: IPS Salary Scale for Teachers

2015-2016 Transition Year Compensation Plan		
Current Step	Transition Level	2015-2016 Salary
1	A	40,000
2	A	40,000
3	B	40,500
4	C	41,900
5	D	43,500
6	E	44,900
7	F	46,300
8	G	47,700
9	H	49,100
10	I	50,600
11	J	52,000
12	K	53,500
13	L	55,000
14	M	56,900
15	M	56,900
16	M	56,900
17	M	56,900
18	M	56,900
19	M	56,900
20	N	58,200
21	N	58,200
22	N	58,200
23	N	58,200
24	N	58,200
25	O	58,600

IPS has announced a transition from a step-based approach based on years of service and qualifications towards a performance-based approach for teacher compensation. This is reflected in the table above, obtained from the IPS website.

TechIndy will use the step approach for initial placement of newly hired teachers on the scale, and will subsequently use performance and promotion levels to advance teachers on the scale. It is expected that promotions will advance teachers on the scale, and a preliminary pay grid for the different levels of teachers is shown below.

	Requirements	Pay level
Associate Teacher	0-3 years experience	$36,000 – 40,000
Teacher	3-5 years experience Proficient performance rating for at least two years	$40,000 – 45,000
Senior Teacher	5-7 years experience Proficient performance for at least two years in previous position at TechIndy	$43,000 – 47,000
Master Teacher	5-20 years experience Master's degree Exemplary performance for at least three years in previous position at TechIndy	$47,000 – 55,000
Teacher Leader	5- 10 years experience Master's degree Exemplary performance for at least three years in previous position at TechIndy	$50,000 - $58,000

Teachers who achieve Basic ratings will receive a cost of living increase, while teachers who achieve proficient or exemplary performance will receive higher increases based on school community and Board agreement on increases.

Appendix 9: Letters of Support

Eli Lilly and Company

Lilly Corporate Center
Indianapolis, Indiana 46285 U.S.A.
+1.317.276.2000
www.lilly.com

September 9, 2016

Mr. Ahmed Young
Office of Education Innovation
City of Indianapolis Office of the Mayor
2501 City Council Building
200 E. Washington St.
Indianapolis, Indiana 46204

Dear Ahmed,

Please accept this letter of support for the charter application for TechIndy School of Science and Engineering. We believe the school will provide a much-needed focus on STEM education, global competency, and youth leadership in Indianapolis, and will provide a supportive culture for the success of our children. In particular, the school's focus on college and career readiness is especially important.

Lilly has been an ardent supporter of innovative new school models and improved public school options for all families in Indianapolis. In addition, we have been a passionate advocate for efforts that prepare and motivate students to study and excel in STEM subjects.

We have been advised of TechIndy's proposed concept, and believe that it aligns well with these interests. It is a well-researched, innovative new model that will create a compelling option for interested families. TechIndy will foster academic and developmental success, while providing a strong STEM foundation. Further, the proposed school has strong leadership and a highly-qualified board that is connected to the community.

We believe TechIndy will be an asset to Indianapolis and recommend you favorably consider their charter application.

Sincerely,

Robert L. Smith
Senior Director – Corporate Responsibility, Eli Lilly and Company
President – Eli Lilly and Company Foundation

September 12, 2016

Mr. Ahmed Young
Office of Education Innovation
City of Indianapolis Office of the Mayor
2501 City Council Building
200 E. Washington St.
Indianapolis, IN 46204

Dear Mr. Young,

Please accept this letter of support for the charter application for TechIndy School of Science and Engineering. We understand and believe this school can provide an additional and much-needed focus on STEM education, global competency and youth leadership in Indianapolis, thereby providing a supportive culture for the success of our children. In particular, the school's focus on college and career readiness is especially important for students in the community.

BioCrossroads is a working coalition of the State's leading life sciences companies, research universities and community leaders focused for the past dozen years on driving additional capital, talent and opportunity to sustain and grow Indiana's significant life sciences industry. With a heavy concentration in Indianapolis and surrounding counties, Indiana's life sciences sector represents one of the strongest healthcare clusters in the United States today, consisting of nearly 2000 enterprises employing over 60,000 Hoosiers in jobs with an average annual salary of $96.000—more than twice the average Indiana wage—and providing an over $60 billion contribution to our economy. To maintain and expand our competitive advantage in this science-driven sector, Indiana's K-12 schools must be increasingly prepared, and ambitious, in efforts to provide effective STEM training to ensure the readiness of our next generation. For that reason, BioCrossroads, with the sponsorship of our philanthropic and corporate stakeholders, has for more than a decade coordinated efforts like the I-STEM Initiative to provide better and more targeted STEM instruction in our schools. This program is promising and has proven effective—but from our hands-on involvement in this effort, we know first-hand that we still have a long way to go to enhance our overall STEM readiness.

Against this background, we have been advised of TechIndy's proposed educational focus, and believe that it is an innovative school model that will serve a significant need and provide for students' academic and developmental success. We are very familiar

with key members of the proposed school's strong Board that will readily inform and energize its mission and will represent an additional and significant asset through their service to the community. We recommend this school's charter application.

Sincerely,

David Lawther Johnson
President and CEO
Central Indiana Corporate Partnership, Inc.
BioCrossroads

October 3, 2016

Mr. Ahmed Young, Office of Education Innovation
City of Indianapolis, Office of The Mayor
2501 City-Council Building, 200 E. Washington St
Indianapolis, IN 46204

Dear Mr. Young,

On behalf of the Near West Collaborative and River West Great Place, please accept this letter of support for the charter application for TechIndy School of Science and Engineering. We believe the school will provide a much-needed focus on STEM education, global competency and youth leadership in Indianapolis, and we are pleased the school is considering Indianapolis's Near West side as a location for the school.

The Near West Collaborative is the cooperative community governance association, with contributing residential and partner organization participation from our four neighborhoods within Near West Indianapolis: Haughville, Hawthorne, Stringtown and We Care. We have both a Quality of Life plan (see www.nearwestindy.com) and a Great Places 2020 plan (see www.greatplaces2020.org) in place. Both plans call for concerted focus on enhancing and broadening our educational options for Near West residents.

As part of the River West's Great Place strategy to improve the quality of life in the Near West side, we are supportive of the establishment of a new high school that will provide a strong college and career preparatory program for students in the community, and that serve as a hub for the community. As an open enrollment school, it will also attract other students to the neighborhood and, ultimately, create a strong pipeline of talent for the technology companies and higher education programs in the neighborhood. We know that we are geographically ideally situated to be that pipeline to higher education and sustainable wages for Near West families, and we are delighted that TechIndy also recognizes that geographic advantage that we offer.

We believe TechIndy's academic model provides a strong option for Near West families and in Indianapolis in general. We recommend that you consider their application favorably.

Sincerely,

Martha Henn

Martha Henn
Convener

NEAR WEST COLLABORATIVE
777 Indiana Avenue, Suite 200, Indianapolis, IN 46202 • hennm@iupui.edu • 317.278.2344

4000 Michigan Road
Indianapolis, IN 46208
t 317-923-1331
f 317-920-0399
imamuseum.org

September 28, 2016

INDIANAPOLIS MUSEUM OF ART
IMA

Mr. Ahmed Young
Office of Education Innovation
City of Indianapolis Office of the Mayor
2501 City Council Building
200 E. Washington St.
Indianapolis, IN 46204

Dear Mr. Young,

Please accept this letter of support for the charter application for TechIndy School of Science and Engineering. As head of the Academic Engagement department at the Indianapolis Museum of Art (IMA), I find the school's educational model of integrating the Arts with the Sciences and Engineering in the school's project-based approach to be an innovative approach to build creativite and more holistically educated students.

As the largest visual arts institution in the state, the IMA enhances the overall quality of life in Indiana through the presentation of distinctive exhibitions and innovative programs for diverse audiences; the collection and care of more than 54,000 works of art; and the preservation of more than 152 acres of historic gardens and grounds. In addition to the IMA's annual *Summer Camps* program, several of the museum's educational initiatives include: *Viewfinders*, a school program that offers teachers training and support in using Visual Thinking Strategies in their classrooms; *After School*, an on-site after-school program for K-12 students; and numerous themed tours, such as our newly launched STEAM tours.

The Indianapolis Museum of Art is committed to enriching lives through exceptional experiences with art and nature, and we are currently exploring various ways of working with TechIndy. It is my hope that TechIndy will be able to take advantage of several of the offerings that the IMA provides to local schools, including free educational tours of its galleries led by professionally trained docents, as well as utilizing the IMA as a resource for educators through our professional development events, talks, and open houses. Additionally, I welcome this opportunity to work together on initiatives that meet the unique needs of this visionary school, such as providing educational advisement for the development of inter-disciplinary curriculum units, providing professional development, hosting student tours, and other learning activities.

The proposed school emerges from a research-grounded vision that highlights the importance of the arts and creativity in the school and will be an asset to the community. I recommend you favorably consider the school's charter application.

Sincerely, Heidi Davis-Soylu

Heidi Davis-Soylu, PhD

Director of Academic Engagement and Learning Research

TNTP reimagine teaching

August 12, 2016

Mr. Mahmoud Sayani
Fellow
The Mind Trust
1630 North Meridian Street, Suite 450
Indianapolis, IN 46202

Dear Mr. Sayani:

On behalf of TNTP's Indianapolis Teaching Fellows program, we would like to extend our sincere congratulations on your planned hybrid STEM/International Baccalaureate school, providing students in Indianapolis an alternative school option. We look forward to the opportunity to partner with your school by potentially placing teachers trained by the TNTP Indianapolis Teaching Fellows program for the 2017-18 school year.

We wish you the best of luck as you move forward with the establishment of your new school.

Sincerely,

Scott Syverson

Scott Syverson, Ph.D.
Senior Director, Indianapolis Teaching Fellows, TNTP

Chris Henderson

Chris Henderson
Partner, TNTP

peace learning CENTER

building peace for healthy communities

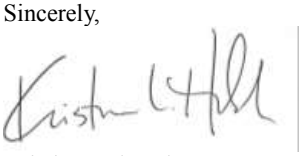
September 27, 2016

Mr. Mahmoud Sayani:

Thank you for your interest and dedication to creating a healthy and peaceful school community in TechIndy.

Peace Learning Center is eager to partner with TechIndy for the upcoming 2016-2017 school year as well as in the immediate future to help build out meaningful training, protocol, and plans for implementation of Restorative Practices in Tech Indy. We look forward to helping you establish restorative practices as a way to create a peaceful, healthy learning environment.

Sincerely,



Kristina Hulvershorn
Youth Program Director

6040 DeLong Road, Indianapolis, IN 46254 | 317.327.7144 | Fax: 317.327.7312 | www.PeaceLearningCenter.org

September 30, 2016

Mr. Ahmed Young
Office of Education Innovation
City of Indianapolis, Office of the Mayor
2501 City Council Building
200 E. Washington Street
Indianapolis, IN 46204

Dear Mr. Young,

Please accept this letter of support for the charter application of TechIndy School of Science and Engineering. As Program Director of the Youth Philanthropy Initiative of Indiana (YPII), I'm thrilled with the school's intention to incorporate concepts of giving and serving (philanthropy) into their project-based learning model.

YPII is local based in Indianapolis and national connected; we are a signature program of the Indiana Philanthropy Alliance. As a statewide initiative we engage adult mentors/educators and youth ages 3-24 with our mission "to grow lifelong philanthropists who give of their time, talent, and treasure through the common good." We support this mission by providing best practices, technical assistance, resources, and training to foundations and youth-serving organizations.

In addition to consulting with Mahmoud Sayani to incorporate the philanthropic themes of time, talent, and treasure into TechIndy, YPII is also providing the fourth philanthropic "t", "ties." We have introduced TechIndy to several of our YPII Partner Network organizations and leaders, using the concept of building upon relationships with others to expand philanthropic opportunities for youth.

Mahmoud's proposed school builds on YPII's vision that all young people in Indiana are aware, educated, and engaged in philanthropy. We are thrilled to support a school model that incorporates philanthropic education, service-learning, and community engagement.

Sincerely,

Jill R. Gordon

Jill Gordon
Program Director
Youth Philanthropy Initiative of Indiana (YPII)

32 E. Washington Street | Suite 1100 | Indianapolis, IN 46204
Phone–317.630.5200 | jgordon@inphilanthropy.org

Easter Seals Crossroads
dis|ability services
Our emphasis is on ability.

4740 Kingsway Drive • Indianapolis, IN 46205
p/ 317.466.1000 • f/ 317.466.2000
www.eastersealscrossroads.org

September 7, 2016

Mr. Mahmoud Sayani
Innovation School Fellow - Cohort 2
The Mind Trust
1630 N. Meridian St., Suite 450
Indianapolis, IN 46202

Dear Mr. Sayani,

It was a pleasure to meet and talk with you last week concerning your plans for TechIndy—School of Science and Engineering serving students in grades 9-12. Your planned curriculum combined with your guiding principles that embrace creativity, global competence and youth leadership will certainly result in student success.

As we discussed, Easter Seals Crossroads employs a well qualified and talented staff to provide a wide array of special education services that include physical, occupational and speech-language therapy services; assistive technology services; prevocational and life skills services; behavioral consultation services including psychological evaluations; and school-to-work transition services and supports. We would welcome making these services available to your students, as needed.

Please let me know if you have any questions or a need for additional information concerning any of our services. We look forward to the opportunity to work together in 2017.

Best regards,

Sherry Floyd

Sherry Floyd
Director, Children's and Medical Services

Strengthening nonprofits and the communities they serve.

Sharing a mission of change

Illinois
333 South Wabash Ave.
Suite 2800
Chicago, IL 60604
312 629 0060

Indiana
The Platform
202 East Market St.
Indianapolis, IN 46204
317 860 6900

Michigan
3011 West Grand Blvd.
Suite 1715
Detroit, MI 48202
313 309 7825

Minnesota
527 Marquette Ave.
Suite 1150
Minneapolis, MN 55402
612 814 0310

Missouri
911 Washington Ave.
Suite 203
St. Louis, MO 63101
314 588 8840

Ohio
500 South Front St.
Suite 125
Columbus, OH 43215
614 484 1811

Wisconsin
215 North Water St.
Suite 225
Milwaukee, WI 53202
414 563 1100

September 7, 2016

Mr. Ahmed Young
Office of Education Innovation
City of Indianapolis, Office of the Mayor
2501 City-Council Building
200 E Washington Street
Indianapolis, IN 46202

Mr. Young,

This letter confirms IFF's commitment to partner with Tech Indy High School as they open their first school in Indianapolis.

IFF is a mission-driven lender, real estate consultant, and developer that helps communities thrive by creating opportunities for low-income communities and people with disabilities. Through a Walton Family Foundation grant, IFF is able to provide a range of grant-funded services to schools like Tech Indy to ensure these schools have the tools and resources necessary to launch quality schools.

We are excited to partner with Tech Indy to help the school complete a space needs analysis, evaluate financing scenarios, advise on lease negotiations, assess facility conditions and propose build-out scenarios for IPS or private facilities.

We look forward to partnering with Mr. Sayani of Tech Indy to increase the quality of educational opportunities for students in Indianapolis.

Sincerely,

Nate Lichti
Director of Real Estate Services – Indiana
IFF

iff.org

Office of Education Innovation
City of Indianapolis Office of the Mayor
2501 City Council Building
200 E. Washington St.
Indianapolis, IN 46204

Dear Mr. Young,

This letter confirms The Expectation Project's support for TechIndy School of Science and Engineering. I believe the school will provide a much-needed focus on STEM education, global competency, and youth leadership within the IPS school district, and will provide a supportive culture for the success of our children. In particular, the focus on college and career readiness is especially important for students living in poverty so that they can become engaged in defining their futures.

The Expectation Project's mission is to get people of faith to open their hearts, roll up their sleeves, and get to work on behalf of students. We look forward to working with TechIndy School of Science and Engineering and getting people from various congregations around Indianapolis to work closely with the students in this school to give them the mentoring and support that will make them successful in their careers and their lives.

Sincerely

Jeffry Clayton Woods Ed.D
Regional Director - Indianapolis
The Expectations Project

Appendix 10: Insurance Letter and Estimate

October 3, 2016

Mr. Mahmoud Sayani
TechIndy Charter School
1630 N. Meridian St, Ste 350
Indianapolis, IN 46202

RE: Insurance Coverage for TechIndy Charter School
Broker of Record – Arthur J. Gallagher & Co.

Dear Mr. Sayani:

We are pleased to provide insurance services for TechIndy. Our division specializes in education and charter schools throughout the country. We currently work in many states helping schools secure insurance and are licensed to work in The State of Indiana as required by law.

Our program utilizes the following carriers which are admitted in the State of Indiana: The Hartford, AIG, Philadelphia Insurance Company, Scottsdale Insurance Company, United States Fire Insurance Company.

We will only place this school with at least an "A-, VII" rated insurance carrier as determined by AM Best rating guidelines. On behalf of TechIndy, the following coverages will be secured to meet all requirements of the authorizing agency and/or additional insureds as appropriate:

Coverage	Limit
General Liability (includes corporal punishment, athletic participation*)	$1,000,000 occurrence expressly covers field trips $3,000,000 aggregate limit
Workers Compensation **Workers' Compensation Part II (Employers' Liability)**	As specified by Indiana Statutes $1,000,000
Employee Benefits Liability	$1,000,000 per claim dedicated limit $3,000,000 aggregate limit
Automobile/Bus Liability including non-owned and hired; underinsured as needed	$1,000,000 combined single limit
Employment Practices Liability	$1,000,000 per claim/annual aggregate dedicated limit
Educators Legal Liability (School Leaders E&O and/or Professional Liability)	$2,000,000 per claim/annual aggregate dedicated limit
Directors & Officers	$1,000,000 per claim/annual aggregate dedicated limit
Fiduciary Liability	$1,000,000 per claim/annual aggregate dedicated limit
Sexual Abuse and Misconduct Liability	$1,000,000 dedicated limit $3,000,000 aggregate limit
Crime	
Employee Dishonesty	$1,000,000 per occurrence
Forgery or Alteration	$1,000,000 per occurrence
Inside Premises – Theft of Monies & Securities	$1,000,000 per occurrence
Outside the Premises	$1,000,000 per occurrence
Computer Fraud	$1,000,000 per occurrence
Money Orders/Counterfeit Papers	$1,000,000 per occurrence
Bonds	Can secure a Treasurers Bond, when needed
Property and Boiler Machinery Coverage	Blanket Limits as needed, on an all risk of direct physical basis (replacement cost to school building for fire and theft)
Business Income/Extra Expense	$300,000 Extra Expense included Business Income as needed based upon cash flow

Student Accident Coverage* (including or excluding football)	Primary $25,000 CAT at $1,000,000 or $5,000,000
Cyber Security Liability**	$500,000 per loss or claim/aggregate limit
Coverage	**Limit**
Umbrella / Excess Liability above primary program (GL, Auto, Abuse, D&O, EPLI, ELL, EBL)	Options up to $25,000,000
*In order for the general liability to include athletic participation, student accident coverage must be purchased. Catastrophic Student Accident is required for football exposures. In addition parental waivers and confirmation of health insurance from parents is also required. **Recommended coverage, however may not be required by charter authorizer	

Additional Insureds/Loss Payees:

Our program includes the Charter Authorizer, their respective members, officers, employees, officials and agents as additional insureds on the Directors and Officers policy. In addition our General Liability policy includes blanket Additional Insureds status for Managers or Lessors or Premises; By Contract, Agreement or Permit; and Funding Source. Loss Payees can be added to the property upon our review of the lease/funding contracts.

Estimated Premiums:

The estimate below has been prepared based on current market rates, anticipated student population, number of fulltime employees and building dimensions. The insurance estimate is based on the types and amounts of insurance that are required by your authorizer, the Indianapolis Office of Education and Innovation.

Coverage	Year 1 Premium Indication
General Liability/Abuse/Crime/Auto/Employee Benefits/Educators E&O	$ 6,950
Directors & Officers / Employment Practices	$ 3,154
Property	$ 1,200
Cyber Liability	$ 800
Excess $10 million Limits (follow form over underlying)	$ 2,752
Workers Compensation/Employers Liability	$ 5,141
Total Annual Premium	**$ 19,997**

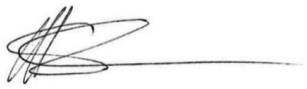
Premiums are based upon 1st year projections of 200 students, 18 staff members, $1,150,,000 payroll, $50,000 contents.

Tentative Timeline for Insurance Coverages
As part of your planning process, we have prepared a timeline for buying the insurance package before start of the school year. See below for each coverage:

Coverage	Timeline
Directors and Officers /Educators Legal Liability	As soon as board is formed and making school based decisions (contracts)
Employment Practices Liability	Before first employee is hired
Workers Compensation	When first employee is hired or board is formed.
General Liability, Excess, Crime, Sexual Abuse, Auto Liability, Student Accident (please ask for this separately if you would like the coverage).	When lease agreement is signed or property is purchased (landlord will require General Liability coverage).
Property/Flood	As soon as you acquire contents/school equipment

Please let me know if you have any questions.

Sincerely,



Martin S. Dezelan
Area Vice President

Appendix 11: 12-month Cash Flow and 5-year Budget

OFFICE of EDUCATION INNOVATION

[2] First Fiscal Year Cash Flow Analysis

Please enter anticipated revenue streams below. If a revenue source is not listed, please enter it in line 23, 24 or 25. Revenue assumptions should be highly detailed in column R,explaining the basis for your assumption. Total expenses calculated from tabs 4-8.

Enter Name of School and Applicable Fiscal Year

1	TechIndy School of Science and Engineering	2017-18

2 Enter Revenue Assumptions below — Basic grant calculated from

	Income	July	August	September	October	November	December	January	February	March	April	May
1	Basic Grant	$ 116,626.80	$ 116,626.80	$ 116,626.80	$ 116,626.80	$ 116,626.80	$ 116,626.80	$ 116,626.80	$ 116,626.80	$ 116,626.80	$ 116,626.80	$ 116,626.80
2	Student Breakfast											
3	Student Lunch											
4	State Matching Funds											
5	Federal Lunch Program		$ 9,025.80	$ 9,025.80	$ 6,876.80	$ 8,596.00	$ 4,298.00	$ 8,596.00	$ 8,166.20	$ 6,447.00	$ 8,166.20	$ 8,166.20
6	Federal Breakfast Reimbursement											
7	Committed Donations											
8	State Remediation Program											
9	Title I	$ -	$ -	$ -	$ -	$ 11,500.00	$ 11,500.00	$ 11,500.00	$ 11,500.00	$ 11,500.00	$ 11,500.00	$ 11,500.00
10	Title II (Professional Development)						$ 7,500.00					
11	Title III											
12	Title IV											
13	IDEA 611/619	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
14	State Special Education Support							$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
15	Other Federal Grants											
16	Interest Income											
17	Textbook Fees		$ 5,400.00						$ 5,400.00			
18	Texbook Reimbursement						$ 5,320.00					
19	Before and after care											
20	Other Income											
21	Other local income											
22	Overpayments/Refunds											
23	Other- startup grant Walton Foundation											
24	Other - startup grant The Mind Trust											
25	Other - line of credit	$ 75,000.00	$ -	$ -	$ -				$ (10,000.00)	$ (10,000.00)	$ (20,000.00)	$ (35,000.00)
	Total Income	**$ 191,626.80**	**$ 131,052.60**	**$ 125,652.60**	**$ 123,503.60**	**$ 136,722.80**	**$ 145,244.80**	**$ 146,722.80**	**$ 141,693.00**	**$ 134,573.80**	**$ 126,293.00**	**$ 111,293.00**
	Total Expense	**$ 249,760.58**	**$ 128,286.38**	**$ 132,536.38**	**$ 128,387.38**	**$ 131,506.58**	**$ 178,458.58**	**$ 142,356.58**	**$ 130,576.78**	**$ 127,757.58**	**$ 125,176.78**	**$ 129,326.78**
	Net Income	**$ (58,133.78)**	**$ 2,766.22**	**$ (6,883.78)**	**$ (4,883.78)**	**$ 5,216.22**	**$ (33,213.78)**	**$ 4,366.22**	**$ 11,116.22**	**$ 6,816.22**	**$ 1,116.22**	**$ (18,033.78)**
	Beginning Cash Balance	**$ 152,712.80**	**$ 94,579.02**	**$ 97,345.24**	**$ 90,461.46**	**$ 85,577.68**	**$ 90,793.90**	**$ 57,580.12**	**$ 61,946.34**	**$ 73,062.56**	**$ 79,878.78**	**$ 80,995.00**
	Ending Cash Balance	**$ 94,579.02**	**$ 97,345.24**	**$ 90,461.46**	**$ 85,577.68**	**$ 90,793.90**	**$ 57,580.12**	**$ 61,946.34**	**$ 73,062.56**	**$ 79,878.78**	**$ 80,995.00**	**$ 62,961.22**

June	Total	Expense by Revenue	Net Income	Assumptions
$ 116,626.80	$ 1,399,521.64	$ 1,443,557.00	$ (44,035.36)	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
$ 4,298.00	$ 81,662.00	$ 81,662.00	$ -	$3.07 per student; 70%
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
$ 11,500.00	$ 92,000.00	$ 105,000.00	$ (13,000.00)	$460 per student
$ 7,500.00	$ 15,000.00	$ 13,950.00	$ 1,050.00	estimate per consultant
	$ -	$ -	$ -	
	$ -	$ -	$ -	
$ 5,000.00	$ 30,000.00	$ 86,250.00	$ (56,250.00)	$150 per student on avg
$ 5,000.00	$ 30,000.00	$ -	$ 30,000.00	Dist. In basic grant calc.
	$ -	$ -	$ -	State sped exp incl in basic grant
	$ -	$ -	$ -	
	$ 10,800.00	$ 14,400.00	$ (3,600.00)	$180 per student
$ 5,320.00	$ 10,640.00	$ 9,120.00	$ 1,520.00	for F&RM students
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	Walton fondaiton
	$ -	$ -	$ -	The Mind Trust
	$ -	$ -	$ -	
$ 155,244.80	**$ 1,669,623.64**			
$ 149,808.58	**$ 1,753,939.00**			
$ 5,436.22	**$ (84,315.36)**			

$ 62,961.22
$ 68,397.44

OFFICE of EDUCATION INNOVATION

[3] Five-Year Budget Template

Please enter 1) Name of School 2) Projected Enrollment and 3) anticipated revenue streams below. If a revenue source is not listed, please enter it in line 23, 24 or 25. Total expenses calculated from tabs 4-8.

Enter Name of School

1 **Techindy School of Science and Engineering**

2	**Projected Enrollment**		200	300	400	420	450
3	**Enter Revenue Assumptions below**						

Basic grant calculated from Tab 1. Out year calculations assume flat rate per pupil funding. Please articulate any adjustments on tab 9, Question 3.

	Income	Pre-Opening	2017-18	2018-19	2019-20	2020-21	2021-22
1	Basic Grant		$1,399,521.64	$2,019,522.00	$2,692,696.00	$2,827,330.80	$3,029,283.00
2	Student Breakfast		$ -				
3	Student Lunch		$ -				
4	State Matching Funds		$ -				
5	Federal Lunch Program		$ 81,662.00	$ 122,493.00	$ 163,324.00	$ 171,490.20	$ 183,739.50
6	Federal Breakfast Reimbursement		$ -				
7	Committed Donations		$ -				
8	State Remediation Program		$ -				
9	Title I		$ 92,000.00	$ 138,000.00	$ 184,000.00	$ 193,200.00	$ 207,000.00
10	Title II (Professional Development)		$ 15,000.00	$ 15,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00
11	Title III		$ -				
12	Title IV		$ -				
13	IDEA 611/619		$ 30,000.00	$ 45,000.00	$ 60,000.00	$ 63,000.00	$ 67,500.00
14	State Special Education Support		$ 30,000.00	$ 45,000.00	$ 60,000.00	$ 63,000.00	$ 66,000.00
15	Other Federal Grants		$ -				
16	Interest Income		$ -				
17	Textbook Fees		$ 10,800.00	$ 16,200.00	$ 21,600.00	$ 22,680.00	$ 24,300.00
18	Texbook Reimbursement		$ 10,640.00	$ 15,960.00	$ 21,280.00	$ 22,344.00	$ 23,940.00
19	Before and after care		$ -				
20	Other Income		$ -				
21	Other local income		$ -				
22	Overpayments/Refunds		$ -				
23	Other -Startup grant Walton Foundation	$ 325,000.00					
24	Other - startup grant The Mind Trust	$ 125,000.00					
25	Other - IFF financing for facility improvement	$ 500,000.00	$ -				
	Total Income	**$ 950,000.00**	**$ 1,669,623.64**	**$ 2,417,175.00**	**$ 3,222,900.00**	**$ 3,383,045.00**	**$ 3,621,762.50**
	Total Expense	**$ 797,287.20**	**$ 1,753,939.00**	**$ 2,367,916.50**	**$ 3,168,375.17**	**$ 3,285,286.32**	**$ 3,517,419.17**
	Net Income	**$ 152,712.80**	**$ (84,315.36)**	**$ 49,258.50**	**$ 54,524.83**	**$ 97,758.68**	**$ 104,343.33**
	Beginning Cash Balance		**$ 152,712.80**	**$ 68,397.44**	**$ 117,655.94**	**$ 172,180.77**	**$ 269,939.45**
	Ending Cash Balance	**$ 152,712.80**	**$ 68,397.44**	**$ 117,655.94**	**$ 172,180.77**	**$ 269,939.45**	**$ 374,282.79**

Total expenses calculated from Tabs 4-8

[9] Budget Narrative

Instructions

Please respond to the the budget narrative questions below.

	Question	Briefly Describe Proposed Activities
1	Detail your contingency plans should you experience a budget shortfall, low student enrollment or other operational difficulties.	If we experience low student enrollment, we will reduce our staffing and operating expenditures to mini the operating deficit. At the same time, we will increase our community engagement and marketing eff to ensure the numbers increase going forwRD.
2	Explain how the school will make certain that sufficient funds are available to cover a) any special education costs incurred and b) any transportation costs necessary to ensure the school will be both open and accessible	Special education costs are a priorityand the federal IDEA grants and sufficient funds from state funding be set aside once students with special needs and their supports have been defined.
3	Explain your rationale for the enrollment projections you made on Tabs 1 and 3	The enrollment projections are based on the curent demographics in the near North area and the suppl public high school seats, which shows a gap of 1,000 seat in the supply. The projected enrollment is 20 the gap which is reasonable. The numbers projected are also similar to other high school charter applica submitted.
4	Please include any additional details necessary for understanding your strategic budgeting priorities.	The strategic budgeting priorities are to invest in teachers to ensure they are competent in the schoo pedagogical model and can help students achieve their academic goals. Investments have also bee targeted for equipment and curriculum from the IB and PLTW.

Appendix 12: Certificate of Incorporation, Articles and By-Laws

State of Indiana
Office of the Secretary of State

Certificate of Incorporation
of

ED21 CHARTER SCHOOLS, INC.

I, CONNIE LAWSON, Secretary of State, hereby certify that Articles of Incorporation of the above Domestic Nonprofit Corporation have been presented to me at my office, accompanied by the fees prescribed by law and that the documentation presented conforms to law as prescribed by the provisions of the Indiana Nonprofit Corporation Act of 1991.

NOW, THEREFORE, with this document I certify that said transaction will become effective Friday, August 12, 2016.

In Witness Whereof, I have caused to be affixed my signature and the seal of the State of Indiana, at the City of Indianapolis, August 12, 2016

Connie Lawson

CONNIE LAWSON
SECRETARY OF STATE

201608121153821 / 7374413

To ensure the certificate's validity, go to https://bsd.sos.in.gov/PublicBusinessSearch

ARTICLES OF INCORPORATION
OF
ED21 CHARTER SCHOOLS, INC.

The undersigned Incorporator, desiring to form a corporation (the "Corporation") pursuant to the provisions of the Indiana Nonprofit Corporation Act of 1991, as amended (the "Act"), hereby executes the following Articles of Incorporation:

ARTICLE I

Name

The name of the Corporation is Ed21 Charter Schools.

ARTICLE II

Purposes

This Corporation is a public benefit corporation that shall be organized and operated exclusively to conduct, support, encourage, and assist such educational, charitable, scientific, and other programs and projects as are described in Sections 170(c)(2)(B), 501(c)(3), 2055(a)(2), and 2522(a)(2) of the Internal Revenue Code of 1986, as amended, or corresponding provisions of any subsequent federal tax laws (the "Code"). In furtherance of such purposes, the Corporation's specific purposes shall include operating one or more innovation network charter schools pursuant to Indiana Code, Title 20, Article 25.7, or corresponding provisions of any subsequent Indiana statute governing innovation network schools.

ARTICLE III

Powers

Notwithstanding any other provision of these Articles of Incorporation, neither the Board of Directors nor the Corporation shall have the power or authority to do any act that will prevent the Corporation from being an organization described in Code sections 170(c)(2)(B), 501(c)(3), 2055(a)(2), and 2522(a)(2). Subject to the foregoing statement, and subject to and in furtherance of the purposes for which it is organized, the Corporation shall possess, in addition to the general rights, privileges, and powers conferred by the Act or by other law, the following rights, privileges, and powers:

Section 1. To indemnify any person against liability and expenses, and to advance the expenses incurred by such person, in connection with the defense of any threatened, pending, or completed action, suit, or proceeding, whether civil, criminal, administrative, investigative, or

otherwise, and whether formal or informal, to the fullest extent permitted by applicable law, or, if not permitted, then to any extent not prohibited by such law.

Section 2. To cease its activities and to dissolve and surrender its corporate franchise.

ARTICLE IV

Period of Existence

The period during which the Corporation shall continue is perpetual.

ARTICLE V

Initial Registered Agent and Initial Registered Office

Section 1. The name and address of the initial registered agent in charge of the Corporation's initial registered office are Mahmoud Sayani, 1630 N. Meridian St., Ste. 450, Indianapolis, Indiana, 46202.

Section 2. The street address of the initial registered office of the Corporation is 1630 N. Meridian St., Ste. 450, Indianapolis, Indiana, 46202.

Section 3. The undersigned hereby represents that the registered agent named in this Article has consented to the appointment of registered agent.

ARTICLE VI

Incorporator

The name and address of the Incorporator of the Corporation are Mahmoud Sayani, 1630 N. Meridian St., Ste. 450, Indianapolis, Indiana, 46202.

ARTICLE VII

Members

The Corporation shall not have "members" as that term is defined in the Act. The Corporation may, upon the resolution of the Board of Directors, designate as "members" certain individuals, corporations, or other associations and organizations who satisfy certain criteria established by the Board of Directors and who support the purposes and programs of the Corporation. Such designation shall carry no legal significance under the Act and shall not entitle such "members" to any vote on Corporation matters or to attendance at Corporation meetings.

ARTICLE VIII

Directors

The exact number of directors of the Corporation shall be specified in or fixed in accordance with the Bylaws of the Corporation at a number no smaller than three (3).

ARTICLE IX

Election or Appointment of Directors

The directors of the Corporation, other than the members of the initial Board of Directors, shall be elected and appointed in the manner and for terms as specified in or fixed in accordance with the Bylaws of the Corporation.

ARTICLE X

Initial Board of Directors

The members of the initial Board of Directors of the Corporation shall be elected by the Incorporator. The names and addresses of the members of the initial Board of Directors, each of whom shall have the address of 1630 N. Meridian St., Ste. 450, Indianapolis, Indiana, 46202, are as follows:

Ms. Baindu Bayon

Ms. Amy Horton

Ms. Lisa Prentiss

Ms. Janet Rummel

ARTICLE XI

No Private Inurement

None of the Corporation's net earnings shall inure to the benefit of any private individual.

ARTICLE XII

Regulation of Corporate Affairs

The affairs of the Corporation shall be subject to the following provisions:

Section 1. The Corporation shall ensure that any innovation network charter schools that it operates (the "Schools") will admit students of any race, color, gender, sexual orientation, gender identity, disability, national or ethnic origin, religion, and ancestry to all the rights, privileges, programs, and activities generally accorded or made available to students at the Schools. The Corporation and the Schools it operates shall not discriminate on the basis of race, color, gender, sexual orientation, gender identity, disability, national or ethnic origin, religion, or ancestry (or any other characteristics or categories prohibited under federal, state, or local law) in the administration of its educational policies, admissions policies, scholarship and loan programs, and athletic or other programs administered by the Schools.

Section 2. The Corporation shall comply with all Indiana laws applicable to innovation network charter schools, including (but not limited to) the following provisions of the Indiana Code ("IC"), or corresponding provisions of subsequent Indiana law:

(a) IC 5-14-1.5 et seq. (Indiana's Open Door Law);

(b) IC 5-14-3-1, et seq. (Indiana's Access to Public Records Act);

(c) IC 20-25.7-4-10 (public meeting requirement);

(d) IC 20-24-8-5 (statutes applicable to charter schools);

(e) IC 20-28-11.5 (staff performance evaluations);

(f) IC 20-24-6 (employment of teachers and other personnel in charter schools).

Section 3. Notwithstanding any other provision of these Articles of Incorporation, if for any taxable year the Corporation is deemed a "private foundation" described in Code section 509(a), the Corporation's income shall be distributed at such time and in such manner as not to subject the Corporation to the tax imposed by Code section 4942.

Section 4. Notwithstanding any other provision of these Articles of Incorporation, if at any time the Corporation is deemed a "private foundation" described in Code section 509(a), the Corporation shall not:

(a) Engage in any act of self-dealing as defined in Code section 4941(d);

(b) Retain any excess business holdings as defined in Code section 4943(c);

(c) Make any investment in such manner as to subject the Corporation to tax under Code section 4944; or

(d) Make any taxable expenditure as defined in Code section 4945(d).

Section 5. Neither the Board of Directors nor the Corporation shall have power or authority to do any act that will prevent the Corporation from being an organization described in Code section 501(c)(3).

Section 6. Except as otherwise permitted by Code section 501(h), no substantial part of the activities of the Corporation shall be or consist of carrying on propaganda, or otherwise attempting, to influence legislation.

Section 7. The Corporation shall not participate or intervene in (including the publishing or distributing of any statements) any political campaign on behalf of or in opposition to any candidate for public office.

Section 8. Subject to the provisions of these Articles of Incorporation and applicable law, the Board of Directors shall have complete and plenary power to manage, control, and conduct all the affairs of the Corporation.

Section 9. The power to make, alter, amend, and repeal the Corporation's Bylaws shall be vested in the Board of Directors.

Section 10. No director of the Corporation shall be liable for any of its obligations.

Section 11. Meetings of the Board of Directors may be held at any location, either inside the State of Indiana or elsewhere.

Section 12. All parties dealing with the Corporation shall have the right to rely upon any action taken by the Corporation pursuant to authorization by the Board of Directors by resolution duly adopted in accordance with the Corporation's Articles of Incorporation, Bylaws, and applicable law.

Section 13. The Board of Directors may from time to time, in the Bylaws of the Corporation or by resolution, designate such committees as the Board of Directors may deem desirable for the furtherance of the purposes of the Corporation.

ARTICLE XIII

Dissolution of the Corporation

Upon the dissolution of the Corporation, the Corporation's assets and funds shall be disposed in the following order of priority:

(a) First, to satisfy outstanding payroll obligations to employees of the Corporation;

(b) Second, to creditors of the Corporation for outstanding liabilities;

(c) Third, to satisfy any outstanding debt to the Indiana common school fund;

(d) Fourth, to return any remaining funds received from the Indiana Department of Education (the "Department") to the Department not more than thirty (30) days after dissolution; and

(e) Fifth, to one (1) or more organizations that have been selected by the Board of Directors, that are organized and operated for educational purposes substantially the same as those of the Corporation, and that are described in Code sections 170(c)(2)(B), 501(c)(3), 2055(a)(2), and 2522(a)(2).

If the assets of the Corporation are insufficient to pay all parties to whom the Corporation owes compensation under provisions (a) through (c) in this Article XIII, the priority of the

distribution of assets may be determined by a Judge of the Circuit or Superior Court of Marion County, Indiana (the "Court"). If any assets remain after distribution as outlined above, they shall be disposed of by the Court exclusively for such purposes and to such organization(s) as the Court shall determine, which are organized and operated exclusively for such purposes.

The undersigned Incorporator hereby adopts these Articles of Incorporation and presents them to the Secretary of State of the State of Indiana for filing.

IN WITNESS WHEREOF, the undersigned Incorporator hereby verifies and affirms, subject to penalties of perjury, that the representations contained herein are true, this 10th day of August, 2016.

_____

Mahmoud Sayani, Incorporator

This instrument was prepared by Joshua W. Abel, Attorney at Law, Faegre Baker Daniels LLP, 300 N. Meridian St., Ste. 2700, Indianapolis, Indiana, 46204.

BYLAWS OF
Ed21 Charter Schools, INC.

ARTICLE I

General

Section 1. Name. The name of the corporation is Ed21 Charter Schools, Inc. (the "Corporation").

Section 2. Address. The street address of the Corporation's initial registered office is 1630 N. Meridian St., Ste. 450, Indianapolis, Indiana, 46202. The initial registered agent in charge of the initial registered office is Mahmoud Sayani.

Section 2. Fiscal Year. The fiscal year of the Corporation shall begin on the first day of July and end on the last day of June next succeeding.

ARTICLE II

Board of Directors

Section 1. Directors. The affairs of the Corporation shall be managed, controlled, and conducted by, and under the supervision of, the Board of Directors, subject to the provisions of the Articles of Incorporation (the "Articles") and these Bylaws (the "Bylaws"). The Board of Directors shall have the number of members, no less than three (3), as designated by resolution of the Board of Directors from time to time.

Section 2. Election and Terms. The term of each member of the Board of Directors, other than the initial directors of the Corporation, shall extend for a period of three (3) years and until his or her successor is appointed or elected and qualified. At the regular meeting of the Board of Directors immediately preceding the expiration of the term of any director, or at a special meeting, the directors of the Corporation may elect a new director to replace the director whose term will expire, or has expired. Each such newly elected director shall serve for a term of three (3) years, or such other period as is prescribed by the directors at the time of such election, and until his or her successor is elected and qualified. A director may serve any number of consecutive or nonconsecutive terms, provided that the director continues to meet the qualifications for which he or she was initially elected to serve as a director.

Section 3. Quorum and Voting. A majority of the directors in office immediately before a meeting begins shall constitute a quorum for the transaction of any business properly to come before the Board of Directors. Unless otherwise provided in the Articles or these Bylaws, the

approval of a majority of the directors present at a meeting at which a quorum is present shall be the act of the Board of Directors.

Section 4. Special Meetings. The Board of Directors may hold special meetings for any lawful purpose upon not less than two (2) days' notice, as described in Section 6 of this Article II, upon call by the Chair or by two (2) or more members of the Board of Directors. A special meeting shall be held at such date, time, and place inside the State of Indiana or elsewhere as specified in the call of the meeting.

Section 5. Compliance with Indiana Open Door Law. Notwithstanding any other provision of these Bylaws, the Corporation shall comply in all respects with the Indiana Open Door Law (currently codified at Indiana Code ("IC") section 5-14-1.5-1, et seq.), and any corresponding provision of subsequent Indiana law, in connection with all regular or special meetings of the Board of Directors.

Section 6. Notice of Special Meetings. Oral or written notice of the date, time, and place of each special meeting of the Board of Directors shall be communicated, delivered, or mailed by the Secretary of the Corporation, or by the person or persons calling the meeting, to each member of the Board of Directors so that such notice is effective at least two (2) days before the date of the meeting and complies with the Indiana Open Door Law. The notice need not describe the purpose of the special meeting.

Oral notice shall be effective when communicated. Written, electronic, or telefaxed notice, where applicable, shall be effective at the earliest of the following:

(a) When received;

(b) Five (5) days after the notice is mailed, as evidenced by the postmark or private carrier receipt, if mailed correctly to the address listed in the most current records of the Corporation;

(c) On the date shown on the return receipt, if sent by registered or certified United States mail, return receipt requested, and the receipt is signed by or on behalf of the addressee; or

(d) Thirty (30) days after the notice is deposited with another method of the United States Postal Service other than first class, registered, or certified mail, as evidenced by the postmark, if mailed correctly addressed to the address listed in the most current records of the Corporation.

Section 7. Waiver of Notice. Notice of a meeting may be waived in a writing signed by the director entitled to notice and filed with the minutes or the corporate records. Attendance at or participation in any meeting of the Board of Directors shall constitute a waiver of lack of notice or defective notice of such meeting unless the director shall, at the beginning of the meeting or promptly upon the director's arrival, object to holding the meeting and not vote for or assent to any action taken at the meeting.

Section 8. Means of Communication. The Board of Directors, or a committee thereof, may permit a director or a committee member to participate in a meeting through the use of any means of communication by which all participating directors or committee members, and all members of the public physically present at the place where the meeting is conducted, may simultaneously hear each other during the meeting, provided that (i) such meeting complies in all respects with the provisions of the Indiana Open Door Law in IC 5-14-1.5-3.6, and (ii) the Board of Directors has adopted a policy to govern participation in meetings by electronic communication pursuant to IC 5-14-1.5-3.6. A director or committee member participating in a meeting by such means shall be considered present in person at the meeting.

Section 9. Removal, Resignation, and Vacancies. A director may be removed from office at any time, with or without cause, by two-thirds of the directors then in office. A director may resign at any time by giving written notice of such resignation to the Board of Directors, the President, or the Secretary of the Corporation. The acceptance of a resignation shall not be necessary to make it effective. Such resignation shall take effect at the time specified therein, or if no time is specified, at the time of its receipt by the Board of Directors, the President, or the Secretary. A vacancy on the Board of Directors, whether created by removal or resignation of a director, may be filled by the Board of Directors, and the person elected to fill such vacancy shall serve until the expiration of the term vacated and until his or her successor is elected and qualified.

ARTICLE III

Officers

Section 1. In General. The officers of the Corporation shall consist of a Chair, a Secretary, a Treasurer, and such other officers as the Board of Directors may otherwise elect. All officers may, but need not, be members of the Board of Directors. An officer may simultaneously hold more than one (1) office. Each officer shall be elected by the Board of Directors and shall serve

for one (1) year, or such other period as prescribed by the directors at the time of such election, and until the officer's successor is elected and qualified. Any officer may be removed by the Board of Directors with or without cause. Any vacancy in any office shall be filled by the Board of Directors, and any person elected to fill such vacancy shall serve until the expiration of the term vacated and until his or her successor is elected and qualified.

Section 2. Chair. The Chair shall preside at all meetings of the Board of Directors of the Corporation and shall be responsible for implementing policies established by the Board of Directors. The Chair shall perform such other duties as the Board of Directors may prescribe.

Section 3. Secretary. The Secretary shall be the custodian of all papers, books, and records of the Corporation other than books of account and financial records. The Secretary shall prepare and enter in the minute book the minutes of all meetings of the Board of Directors. The Secretary shall authenticate records of the Corporation as necessary. The Secretary shall perform the duties usual to such position and such other duties as the Board of Directors or the Chair may prescribe.

Section 4. Treasurer. The Treasurer shall prepare and maintain correct and complete records of account showing accurately the financial condition of the Corporation. All notes, securities, and other assets coming into the possession of the Corporation shall be received, accounted for, and placed in safekeeping as the Treasurer may from time to time prescribe. The Treasurer shall furnish, whenever requested by the Board of Directors or the Chair, a statement of the financial condition of the Corporation and shall perform the duties usual to such position and such other duties as the Board of Directors or the Chair may prescribe.

Section 5. Other Officers. Each other officer of the Corporation shall perform such duties as the Board of Directors or the Chair may prescribe.

ARTICLE IV

Committees

Section 1. Executive Committee. The Board of Directors may, by resolution adopted by a majority of the directors then in office, designate two (2) or more directors of the Corporation to constitute an Executive Committee which, to the extent provided in such resolution and consistent with applicable law, shall have and exercise all of the authority of the Board of Directors in the management of the Corporation's affairs during intervals between the meetings

of the Board of Directors. The Executive Committee shall be subject to the authority and supervision of the Board of Directors.

Section 2. Other Committees. The Board of Directors may establish other committees, in addition to the Executive Committee, to accomplish the goals and execute the programs of the Corporation. Such committees shall have such responsibilities and powers as the Board of Directors shall specify. Members of such committees may, but need not, be members of the Board of Directors. A committee member appointed by the Board of Directors may be removed by the Board of Directors with or without cause.

ARTICLE V

Conflicts of Interest

Section 1. General Policy. It is the policy of the Corporation and its Board of Directors that the Corporation's directors, officers, and employees carry out their respective duties in a fashion that avoids actual, potential, or perceived conflicts of interest. The Corporation's directors, officers, and employees shall have the continuing, affirmative duty to report any personal ownership, interest, or other relationship that might affect their ability to exercise impartial, ethical, and business-based judgments in fulfilling their responsibilities to the Corporation. This policy shall be further subject to the following principles:

(a) Directors, officers, and employees of the Corporation shall conduct their duties with respect to potential and actual grantees, contractors, suppliers, agencies, and other persons transacting or seeking to transact business with the Corporation in a completely impartial manner, without favor or preference based upon any consideration other than the best interests of the Corporation.

(b) Directors, officers, and employees of the Corporation shall not seek or accept for themselves or any of their relatives (including spouses, ancestors, and descendants, whether by whole or half blood), from any person or business entity that transacts or seeks to transact business with the Corporation, any gifts, entertainment, or other favors relating to their positions with the Corporation that exceed common courtesies consistent with ethical and accepted business practices.

(c) If a director, or a director's relative, directly or indirectly owns a significant financial interest in, or is employed by, any business entity that transacts or seeks to transact

business with the Corporation, the director shall disclose that interest or position and shall refrain from voting on any issue pertaining to the transaction.

(d) Officers and employees of the Corporation shall not conduct business on behalf of the Corporation with a relative or a business entity in which the officer, employee, or his or her relative owns a significant financial interest or by which such officer, employee, or relative is employed, except where such dealings have been disclosed to, and specifically approved and authorized by, the Board of Directors of the Corporation.

(e) The Board of Directors may require the Corporation's directors, officers, or employees to complete annually (or as otherwise scheduled by the Board) a disclosure statement regarding any actual or potential conflict of interest described in these Bylaws. The disclosure statement shall be in such form as may be prescribed by the Board and may include information regarding a person's participation as a director, trustee, officer, or employee of any other nonprofit organization. The Board of Directors shall be responsible for oversight of all disclosures or failures to disclose and for taking appropriate action in the case of any actual or potential conflict of interest transaction.

Section 2. Effect of Conflict Provisions. The failure of the Corporation, its Board of Directors, or any or all of its directors, officers, or employees to comply with the conflict of interest provisions of these Bylaws shall not invalidate, cancel, void, or make voidable any contract, relationship, action, transaction, debt, commitment, or obligation of the Corporation that otherwise is valid and enforceable under applicable law.

ARTICLE VI

Indemnification

Section 1. Indemnification by the Corporation. To the extent not inconsistent with applicable law, every person (and the heirs and personal representatives of such person) who is or was a director, officer, employee, or agent of the Corporation shall be indemnified by the Corporation against all liability and reasonable expense that may be incurred by him or her in connection with or resulting from any claim, action, suit, or proceeding (a) if such person is wholly successful with respect thereto or (b) if not wholly successful, then if such person is determined (as provided in Section 3 of this Article VI) to have acted in good faith, in what he or

she reasonably believed to be the best interests of the Corporation (or, in any case not involving the person's official capacity with the Corporation, in what he or she reasonably believed to be not opposed to the best interests of the Corporation), and, with respect to any criminal action or proceeding, is determined to have had reasonable cause to believe that his or her conduct was lawful (or no reasonable cause to believe that the conduct was unlawful). The termination of any claim, action, suit, or proceeding by judgment, settlement (whether with or without court approval), or conviction, or upon a plea of guilty or of nolo contendere or its equivalent, shall not create a presumption that a person did not meet the standards of conduct set forth in this Article VI.

Section 2. Definitions.

(a) As used in this Article VI, the phrase "claim, action, suit, or proceeding" shall include any threatened, pending, or completed claim, civil, criminal, administrative, or investigative action, suit, or proceeding and all appeals thereof (whether brought by or on behalf of the Corporation, any other corporation, or otherwise), whether formal or informal, in which a person (or his or her heirs or personal representatives) may become involved, as a party or otherwise:

    (i) By reason of his or her being or having been a director, officer, employee, or agent of the Corporation or of any corporation where he or she served as such at the request of the Corporation;

    (ii) By reason of his or her acting or having acted in any capacity in a corporation, partnership, joint venture, association, trust, or other organization or entity where he or she served as such at the request of the Corporation, or

    (iii) By reason of any action taken or not taken by him or her in any such capacity, whether or not he or she continues in such capacity at the time such liability or expense shall have been incurred.

(b) As used in this Article VI, the terms "liability" and "expense" shall include, but shall not be limited to, counsel fees and disbursements and amounts of judgments, fines, or penalties against, and amounts paid in settlement by or on behalf of, a person.

(c) As used in this Article VI, the term "wholly successful" shall mean (i) termination of any action, suit, or proceeding against the person in question without any finding

of liability or guilt against him or her, (ii) approval by a court, with knowledge of the indemnity provided in this Article VI, of a settlement of any action, suit, or proceeding, or (iii) the expiration of a reasonable period of time after the making of any claim or threat of any action, suit, or proceeding without the institution of the same, without any payment or promise made to induce a settlement.

Section 3. Entitlement to Indemnification. Every person claiming indemnification under this Article VI (other than one who has been wholly successful with respect to any claim, action, suit, or proceeding) shall be entitled to indemnification if (a) special independent legal counsel, which may be regular counsel of the Corporation or any other disinterested person or persons, in either case selected by the Board of Directors, whether or not a disinterested quorum exists (such counsel or person or persons being hereinafter called the "referee"), shall deliver to the Corporation a written finding that such person has met the standards of conduct set forth in Section 1 of this Article VI and (b) the Board of Directors, acting upon such written finding, so determines. The person claiming indemnification shall, if requested, appear before the referee and answer questions that the referee deems relevant and shall be given ample opportunity to present to the referee evidence upon which he or she relies for indemnification. The Corporation shall, at the request of the referee, make available facts, opinions, or other evidence in any way relevant to the referee's findings that are within the possession or control of the Corporation.

Section 4. Relationship to Other Rights. The right of indemnification provided in this Article VI shall be in addition to any rights to which any person may otherwise be entitled.

Section 5. Extent of Indemnification. Irrespective of the provisions of this Article VI, the Board of Directors may, at any time and from time to time, approve indemnification of directors, officers, employees, agents, or other persons to the fullest extent permitted by applicable law, or, if not permitted, then to any extent not prohibited by such law, whether on account of past or future transactions.

Section 6. Advancement of Expenses. Expenses incurred with respect to any claim, action, suit, or proceeding may be advanced by the Corporation (by action of the Board of Directors, whether or not a disinterested quorum exists) prior to the final disposition thereof upon receipt of an undertaking by or on behalf of the recipient to repay such amount unless he or she is entitled to indemnification.

Section 7. Purchase of Insurance. The Board of Directors is authorized and empowered to purchase insurance covering the Corporation's liabilities and obligations under this Article VI and insurance protecting the Corporation's directors, officers, employees, agents, or other persons.

ARTICLE VII

Contracts, Checks, Loans, Deposits, and Gifts

Section 1. Contracts. The Board of Directors may authorize one (1) or more officers, agents, or employees of the Corporation to enter into any contract or execute any instrument on its behalf. Such authorization may be general or confined to specific instances. Unless so authorized by the Board of Directors, no officer, agent, or employee shall have any power to bind the Corporation or to render it liable for any purpose or amount.

Section 2. Checks. All checks, drafts, or other orders for payment of money by the Corporation shall be signed by such person or persons as the Board of Directors may from time to time designate by resolution. Such designation may be general or confined to specific instances.

Section 3. Loans. Unless authorized by the Board of Directors, no loan shall be made by or contracted for on behalf of the Corporation and no evidence of indebtedness shall be issued in its name. Such authorization may be general or confined to specific instances.

Section 4. Deposits. All funds of the Corporation shall be deposited to its credit in such bank, banks, or depositaries as the Board of Directors may designate. Such designation may be general or confined to specific instances.

Section 5. Gifts. The Board of Directors may accept on behalf of the Corporation any gift, grant, bequest, devise, or other contribution for the purposes of the Corporation on such terms and conditions as the Board of Directors shall determine.

ARTICLE VIII

Amendments

The power to make, alter, amend, or repeal the Bylaws is vested in the Board of Directors of the Corporation; provided, however, that any proposed substantive alteration, amendment, or repeal of these Bylaws must be approved in writing by the authorizer of the School (as the term "authorizer" is defined in IC 20-24-1-2.5) prior to the Board of Directors of the Corporation taking any action thereon.

Appendix 13: Leadership Information on Board and School leader

JANET M. RUMMEL

EXECUTIVE MANAGEMENT & EDUCATIONAL LEADERSHIP

Strategic Planning • Leadership Development • Student Achievement

Accomplished Educational Leader with experience in district and school-level operations, finance, leadership development, employee evaluations, curriculum development, and assessment design. Results-oriented, decisive leader with proven success in operations and school improvement at urban and suburban districts. Track record of improving efficiencies, student achievement, and state accountability scores.

CORE COMPETENCIES

- Visionary Leadership
- School Accountability
- Grant Management
- Talent Development
- K-12 Instructional Design
- Organizational Efficiency
- Stakeholder Communication
- Professional Learning
- Financial Responsibility

PROFESSIONAL EXPERIENCE

Goodwill Education Initiatives, Indianapolis, Indiana 7/2012 – 7/2016
Executive Director • Chief Academic Officer • Director of Curriculum • TAP Master Teacher
Provided effective operational and academic leadership for eleven schools, with a budget of $32 million and serving over 3000 students annually.
Led operations and academics with responsibility for bottom-line factors including long-range planning, employee management and talent development, curriculum development, budgeting, and grants management. Directed 5 Regional Directors, 11 School Directors, Special Education Department, Student Services, and general oversight of 200 employees. Redefined instructional delivery and oversaw data collection and analysis.
Key Achievements:

- Substantially improved standards-aligned instructional practices using Acuity, iReady, ISTEP+, ECA, and classroom data
- Optimized graduation plans leading students to graduate with an industry-recognized credential and/or college credits as well as a high school diploma
- Created and implemented Technical Leadership Series, growing talent from within the organization
- Grew The Excel Center network within Indiana and locations in Austin, TX, Memphis, TN, and Washington, D.C.
- Administered full scope of academic services on a contract basis to schools nationwide

Center for College and Career Readiness, Oakbrook Terrace, Illinois 5/2002 – 7/2012
Vice-President • Senior Consultant • Internal Training and Content Specialist
Assisted school districts and state departments of education nationwide in the transition to college and career readiness standards.
Realigned existing educational practices to meet expectations of college and career readiness standards. Collaborated with over 15,000 educators, providing professional development workshops in instruction planning, curriculum mapping, assessment design, and standards-based grading. Created customized needs analysis protocols and implementation plans for schools and states nationwide.
Key Achievements:

- Conceptualized and led the Indiana State Curriculum Mapping Initiative
- Developed Common Core State Standards professional development series in partnership with Education Service Centers and the Indiana Department of Education
- Designed content for Instruction Planner, Curriculum Mapper, and StandardScore software products

Indiana Department of Education, Indianapolis, Indiana 12/2010 – 11/2011
Assessment Specialist
Coordinated development and implementation of state math and science assessments.
Created state assessments (ISTEP+, ECA, and Acuity) in mathematics and science, ensuring alignment to state standards with respect to content and level of rigor. Facilitated the planned state transition to the Common Core State Standards.
Key Achievements:

- Served as primary IDOE contact to schools during the first statewide transition to online testing
- Co-created the Indiana Common Core State Standards Transition Plan
- Assisted schools, parents, and students in determining graduation assessment waiver eligibility

Purdue University, West Lafayette, Indiana 1/2008 – 5/2009
Graduate Coordinator and Teaching Assistant • Student Teacher University Supervisor
Coordinated graduate teaching assistants and curricular materials for EDCI 285 Multiculturalism and Education and mentored and evaluated secondary mathematics student teachers.

Zionsville Community Schools, Zionsville, Indiana 8/1996 – 6/2008
High School Multidisciplinary Program Administrator
Elementary Science/Technology Program Developer
Middle School Science Department Chair
Middle School Science and Mathematics Teacher

EDUCATION AND CREDENTIALS

PhD Candidate, Curriculum and Instruction (Expected 12/2016) • PURDUE UNIVERSITY • West Lafayette, Indiana

Master of Science in Education • INDIANA UNIVERSITY • Bloomington, Indiana
Indiana Building Level Administrators License

Indiana Teacher Certification • IUPUI • Indianapolis, Indiana
Indiana State Teachers Licenses: Biology, Chemistry, Mathematics (Grades 5-12)

Bachelor of Arts, Biology and Political Science • DEPAUW UNIVERSITY • Greencastle, Indiana

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MEMORANDUM

TO: OFFICE OF EDUCATION INNOVATION, OFFICE OF MAYOR JOSEPH H. HOGSETT
FROM: JANET RUMMEL
SUBJECT: TECHINDY CHARTER SCHOOL APPLICATION
DATE: AUGUST 11, 2016

Please accept this memo as my expressed interest in serving in a governing authority capacity for TechIndy School of Science and Engineering. As is evident in my attached resume and as is highlighted below, I bring valuable skills and experience to the Board of Directors of the school.

- 20 years of experience in K-12 education, with an emphasis on STEM education
- Advocate for educational advancement, student achievement, and workforce development
- Leadership position on the Center for College and Career Readiness Board of Directors
- Successful educational leader with extensive experience in curriculum, instruction, assessment, teacher and leadership development, and innovative strategic planning

I do not have any potential conflicts of interest prohibiting me from serving as a board member for the school.

My intention is to be an active and engaged volunteer board member for TechIndy School of Science and Engineering. I will not receive compensation for my efforts and involvement with the school, and I do not have any existing contractual relationships with the school.

I am pleased to be affiliated with TechIndy School of Science and Engineering and look forward to providing a quality education option for students in the Indianapolis community.

Lisa A Prentiss

EDUCATION: **BSME, Purdue University, W Lafayette, IN**
MBA, Kelley School of Business, Indiana University, Bloomington, IN

EXPERIENCE: **Cummins Inc.**

2014 – Present: Chief of Staff & Strategic Initiatives Leader, Cummins Fuel Systems
Organizational effectiveness and business improvement leadership

- Leadership of business level Goal Tree definition and execution management
- Special projects leadership with key potential fuel system partners
- Responsible for design, deployment and implementation of FPC & SBP at Fuel Systems
- Definition & execution of Fuel Systems business team monthly/quarterly staff meetings
- Coordinate & execute quarterly all-employee communication sessions
- Sponsorship for numerous business improvement projects in the functions

2010 - 2014: Director – VPI/VPC, Cummins Turbo Technologies
Overall leadership for new product development and change

- Responsible for the development and implementation of new product development systems and practices applied across a broad, cross-functional, global organization.
- Program leadership for all new platform programs for the next generation of turbochargers. Direct and indirect leadership for 20+ program managers.
- Development of Product Management processes for successful implementation of Synchronized Business Planning as a pilot site for the corporation
- Functional Excellence leadership responsibilities for the Program Management organization worldwide
- Green belt Certification, Sponsor Certification (20+ projects) and Level 4 (FE Leader) Program Management Certification

2007 - 2010: Director, Turbomachinery & Fuel Systems, Light Duty Diesel
Technical leadership responsibility for two major subsystems for the LDD V8 platform

- Development and production readiness of leading edge technology for major subsystems
- Creation of a cooperative co-development team across business unit (BU) lines
- Management of major suppliers and customers

2004 - 2007: Technical Leader, Research & Technology
Technical leadership responsibility for new technology development for light-duty platforms

- Technology development for advanced combustion, aftertreatment, air handling & fuel systems
- Responsible for technical spend forecasting & management
- Developed & presented future platform product business proposals (technical & financial)

2002 - 2004: Program Leader, EBU Off-Highway Business
Program leadership responsibility for derivative off-highway VPI programs

- Responsible for program Charter & Contract development, approval & execution via a cross-functional program team
- Responsible to develop program business case and ensure profitability of the program
- Functional excellence projects to improve Program Leadership across the company

2000 - 2002: Asst Chief Engineer B Series
Technical leadership responsibilities for off-highway B series engines

1996 - 2000: Technical Project Leader
Komatsu Tier 2 with Industrial Power Alliance (Komatsu JV)
Group leader - European Engine Alliance (Iveco JV)
Technical Project Leader B & C Series Off-Highway Tier1

1992 – 1996: Senior Engineer, Technical Specialist & Group Leader
Midrange Off-Highway Combustion, Performance and Emissions Development

Aug 1989 - 1992: Engineer, Corporate Manufacturing Engineering

Memorandum from Governing Board Member – Lisa Prentiss

To the Board of this school I am bringing 27 years of experience in engineering, program management and general management at Cummins, Inc. I am originally from Indianapolis and graduated from IPS for elementary, middle and high school. I bring a strong passion for STEM education and first-hand knowledge and understanding of the talent needs of the business community.

I know of no potential conflicts of interest in my role on this Board.

Lisa Prentiss (□莎) Strategic Initiatives Leader/ CFS LT Chief of Staff
Cummins Fuel Systems 812-377-8646 (office), 812-371-4808
(cell) lisa.a.prentiss@cummins.com

Baindu L. Bayon

PhD Candidate, Department of Medical & Molecular Genetics
Indiana University School of Medicine

SUMMARY

Enthusiastic molecular biomedical scientist with more than 5 years of experience in laboratory-based research in both academia and industry sectors. Demonstrates versatility in acquiring new laboratory skills. Expertise in cell culture, various ELISAs, immunocytochemistry. Extensively trained in Western blot analysis. Widespread biomedical coursework including basic sciences of medical school training. Experience in lab management, leadership, and undergraduate student training. Expertise in neurogenetics of Alzheimer's disease and neurodegeneration. Significant research skills to excel in translational biomedical research. Active involvement in the local community including mentoring and science-based initiatives.

EXPERIENCE

PhD Candidate, Indiana University School of Medicine **May 2012-present**
Medical & Molecular Genetics at Department of Psychiatry, Institute of Psychiatric Research
Dr. Debomoy Lahiri, PhD – Primary Investigator
Research Focus:
• BACE1 Gene Regulation in Alzheimer's disease
• Describing how the latent early-life associated regulation (LEARn) model illustrates a mechanism by which BACE1 is epigenetically regulated

Rotation Student Intern, Indiana University School of Medicine **March 2012-May 2012**
Department of Pediatrics, Herman B. Wells Center for Pediatric Research
Dr. Rebecca Chan, MD, PhD – Primary Investigator
Research Focus: Mutations in the human Shp-2 locus and functions in FLT3-ITD+ leukemia

Rotation Student Intern, Indiana University School of Medicine **January 2012- March 2012**
Department of Microbiology & Immunology
Dr. Louis Pelus, PhD – Principal Investigator
Research Focus: Investigating the effects of PGE2 on survival, self-renewal, homing, and engraftment of transduced HSC; Experiments required handling and sacrificing mice, isolating bone marrow, cell sorting, and flow cytometry

Rotation Student Intern, Indiana University School of Medicine **October 2011-January 2012**
Department of Psychiatry, Institute of Psychiatric Research
Dr. Debomoy Lahiri, PhD – Principal Investigator
Research Focus: Inhibition of BACE1 transcription by blocking the activator, SP1

Biologist, Advanced Testing Laboratory at Eli Lilly & Co., Indianapolis, IN **August 2009-October 2011**
Responsibilities:
• Techniques used included: Western immunoblotting, cell culture, tumor homogenization, bacteria/viral harvesting, Meso Scale Discovery® in-vivo insulin assay, glucose level testing, SDS-PAGE, ELISA

Undergraduate Researcher, Indiana University, Bloomington, IN **August 2002-August 2003**
Department of Biology
Dr. Milton Taylor, PhD – Principal Investigator
Research Focus: To discover whether certain genes are induced by interferon or ribavirin, and identify sequences upstream that might account for their induction in peripheral blood cells

McNair/MEDIC-B Scholar, Indiana University, Bloomington, IN **August 2002-August 2003**
Department of Biology; Dr. Miriam Zolan, PhD – Principal Investigator
Research Focus: To determine the location and nature of the mutation in the meiotic basidiomycete mutant O-376; Techniques included PCR, DNA sequencing, and gel electrophoresis

EDUCATION & TRAINING

- **Indiana University School of Medicine** 2011-present, PhD, Medical & Molecular Genetics
- **Ross University School of Medicine, Dominica, WI** 2004-2006, Basic Sciences Coursework
- **Indiana University, Bloomington** 1999-2003, B.S., Biology

PUBLICATIONS & ABSTRACTS

- **Bayon, BL**, Nho, K, Maloney B, Chopra, N, Lahiri DK. (2016) Regulation of amyloid-beta precursor protein (APP) and beta-secretase 1 (BACE1) expression by transcription factor modulating compounds mithramycin A and tolfenamic acid in human cells. *Abstract* from Society for Neuroscience Annual Meeting, San Diego, California- Accepted.
- **Bayon, BL**, Nho, K, Maloney B, Chopra, N, Lahiri DK. (2016) Differential regulation of amyloid-β precursor protein (APP) and β-secretase 1 (BACE1) by transcription factor (TF) modulating drugs in human cells. *Abstract* from the 66th Annual Meeting of The American Society of Human Genetics, Vancouver, Canada - Accepted.
- Erickson, C, Wink L, **Bayon BL**, Ray B, Schaefer T, Pedapati E, Lahiri DK. (2016) Analysis of Peripheral Amyloid Precursor Protein in Angelman Syndrome. *Am J Med Genet* Part A 9999A:1-4.
- Lahiri DK, Maloney B, **Bayon BL**, Chopra N, White F, Greig NH, Nurnberger JI. (2016) Transgenerational Latent Early-life Associated Regulation (tLEARn): Uniting environment, life exposures, and genetic inheritance across generations. *Epigenomics* 8(3):373-87
- Srinivasan M, Chopra N, **Bayon BL**, Lahiri DK. (2016) Anti-inflammatory and neuroprotective effects of GILZ analogs. *PLoS One*- Under Revision.
- Erickson C, Wink LK, **Bayon BL**, Ray B, Schaeffer TL, Pedapati EV, Lahiri DK. (2016) Analysis of Peripheral Lymphocytic Extracellular Signal Related Kinase Activation in Autism. *Journal of Psychiatric Research.* Under Revision.
- **Bayon, BL**, Nho, K, Maloney, B, Chopra, N, Lahiri, DK. (2015). Transcription factor mediated modulation of amyloid-beta precursor protein (APP) and beta-site APP cleaving enzyme (BACE1) expression as a novel drug target in Alzheimer's disease (AD). *Abstract* from Society for Neuroscience Annual Meeting, Chicago, Illinois. Presentation 214.09/C8
- Lahiri, DK, Maloney, B, Long, JM, Chopra, N, Sambamurti, B, **Bayon, BL**. (2015). Understanding the neurobiology of Alzheimer's disease (AD) by correlating specific AD-associated miRNAs and the MMSE cognitive scale. *Abstract* from Society for Neuroscience Annual Meeting, Chicago, Illinois. Presentation 214.10/C9
- **Bayon, BL**, Nho, K, Maloney, B, Chopra, N, Lahiri, DK. (2015). Transcription factor mediated modulation of amyloid-beta precursor protein (APP) and beta-site APP cleaving enzyme (BACE1) expression as a novel drug target in Alzheimer's disease (AD). Presented at the 65th Annual Meeting of The American Society of Human Genetics, Baltimore, Maryland. Poster 1218T.
- **Bayon, BL**, Bailey, JA, Ray, B, Sambamurti, K, Greig, N, Lahiri, DK. (2015). Role of Sp1 inhibiting drugs in the modulation of amyloid-beta precursor protein (APP) and beta-site APP cleaving enzyme (BACE1) activity in human cells: implications as a novel drug target for Alzheimer's disease. *Abstract* from Indiana Clinical and Translational Sciences Institute (CTSI) Annual Meeting, Indianapolis, Indiana.
- **Bayon, BL**, Bailey, JA, Ray, B, Sambamurti, K, Greig, N, Lahiri, DK. (2014). SP1 inhibitors as modulators of APP and BACE1 levels in human cells: A novel drug target in Alzheimer's disease. *Abstract* from American Society of Human Genetics Annual Meeting, San Diego, California. Poster 1354S.
- **Bayon, BL**, Bailey, JA, Ray, B, Sambamurti, K, Greig, N, Lahiri, DK. (2014). SP1 inhibitors as modulators of APP and BACE1 levels in human cells: A novel drug target in Alzheimer's disease. *Abstract* from Drug Discovery and Therapy World Congress, Boston, Massachusetts. Session Lecture SL-184(a). Poster PO-90.

- **Bayon, BL**, Lahiri, DK, Bailey, JA. (2013). BACE1 gene regulation: A novel drug target in Alzheimer's disease. Alzheimer's & Dementia, 2013. **9**(4, Supplement): p. P304. *Abstract* from Alzheimer's Association International Conference, Boston, Massachusetts.
- **Bayon, BL**, Bailey, JA, Lahiri, DK (2013). BACE1 Gene Regulation: A Novel Drug Target in Alzheimer's disease. Poster session presented at IUPUI Research Day 2013, Indianapolis, Indiana. https://scholarworks.iupui.edu/handle/1805/6938
- **Bayon, BL**, Celerin, M, Zolan, M (2001). Mutation in the msh5 Gene of 0-376 in Coprinus cinereus likely causes an N-Terminus Truncation of the Protein. *Abstract* from Annual Biomedical Research Conference for Minority Students (ABRCMS). Orlando, Florida.

PRESENTATIONS & PEER REVIEWS

- **Poster Presenter:** Society for Neuroscience Annual Meeting, Chicago, IL; October **2015**
- **Poster Presenter:** Annual Society for Neuroscience Diversity Fellows Poster Session, Chicago, IL; October **2015**
- **Poster Presenter:** American Society of Human Genetics Annual Meeting, Baltimore, MD; October **2015**
- **Poster Presenter:** Eli Lilly Grand Rounds, Indianapolis, IN; September **2015**
- **Poster Presenter:** Indiana Clinical and Translational Sciences Institute (CTSI) Annual Meeting, Indianapolis, IN; September **2015**
- **Co-Reviewer:** MAP kinase and PKC signaling pathways modulate NGF-mediated apoE transcription. *Neuroscience Letters* **2014**
- **Co-Reviewer:** The role of epigenomics in the neurodegeneration of ataxia-telangiesctasia. *Epigenomics* **2014**
- **Oral Session Lecturer and Poster Presenter:** Drug Discovery and Therapy World Congress, Boston, MA; June **2014**
- **Co-Reviewer:** Prenatal high fat diet alters the cerebrovasculature and clearance of β-amyloid in adult offspring, Hawkes et al. *The Journal of Pathology* **2014**
- **Attendee:** Eli Lilly and Company and Nature Medicine Symposium: Shifting Paradigms on Alzheimer's Disease, Indianapolis, IN – December **2013**
- **Poster Presenter:** Indiana University-Purdue University Indianapolis Research Day, Indianapolis, IN; April **2013**
- **Attendee:** National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) Midwest Regional Annual Conference, Indianapolis, IN, **2012**

AWARDS & SOCIETIES

- **Winner:** Center for Leadership Development Achievers "Science & Technical Disciplines" Award **2016**
- **Social Media Secretary:** Midwest Africa Chamber of Commerce **2016**
- **Volunteer Mentor:** 100 Black Men of Indianapolis "Financial Literacy Program" **October 2015**
- **Member:** Indy Chamber **September 2015**
- **Award:** President's Diversity Dissertation Fellowship, Indiana University-Purdue University Indianapolis **August 2015**
- **Member:** Indianapolis Urban League, The Exchange **August 2015**
- **Member:** Society for Neuroscience "Neuroscience Scholars Program Associate" **July 2015**
- **Member:** The American Society of Human Genetics, **2014 - present**
- **Member:** Society for Neuroscience, **2013 – present**
- **Member:** National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, **2013 - present**
- **Member:** American Association for the Advancement of Science, **2012-present**
- **Guest Teacher/Volunteer:** College Prep Academy, St. Vincent Hospital, Indianapolis, IN **June 2012 – August 2012**
- **Personal Shopper:** Dress for Success, Indianapolis, IN **July 2011-July 2012**
- **Member:** Organization of Sierra Leoneans in Indiana, **2006-present**
- **Member:** Alpha Chi Sigma, **2002-present**

MEMORANDUM

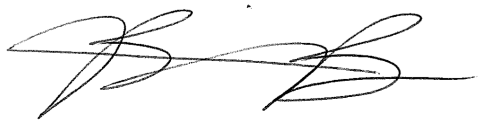
TO:	OFFICE OF EDUCATION INNOVATION, OFFICE OF MAYOR JOSEPH H. HOGSETT
FROM:	BAINDU L. BAYON
SUBJECT:	TECHINDY CHARTER SCHOOL APPLICATION
DATE:	AUGUST 12, 2016

Please accept this memorandum as my expressed interest in serving on the Board of Directors of the TechIndy School of Science & Engineering. As outlined in my attached curriculum vitae, and highlights listed below, I bring a unique skillset and body of experience to the Board.

- PhD candidate in the Department of Medical and Molecular Genetics at the Indiana University School of Medicine with a focus on the neurogenetics of Alzheimer's disease and regulation of beta-secretase
- Extensive biomedical science training with experience in experimental design, hypothesis driven research, peer-review, and evidence-based presentations
- Advocate for minorities in STEM and mentoring through organizations such as the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers and programs such as the College Prep Academy
- 2 years of experience in K-12 education in both Indianapolis Public Schools and Warren Township Schools as a licensed substitute teacher
- Maintenance of strong ties to the community via membership in the Indianapolis Urban League, Midwest Africa Chamber of Commerce, and Organization of Sierra Leoneans in Indiana
- Mentor and volunteer for the 100 Black Men of Indianapolis Financial Literacy Program
- Member of Alpha Chi Sigma, the American Society of Human Genetics, the American Association for the Advancement of Science, and the Society for Neuroscience

I do not have any potential conflicts of interests which would prohibit me from serving on the Board of Directors for the TechIndy School of Science & Engineering. I understand that I will not be compensated for my involvement with the school, nor do I have any existing contractual relationships with the school.

I look forward to being a part of this necessary effort to encourage Indianapolis students to pursue interests in science, technology, engineering, and mathematics.



JOEL N. GITHIRI, CPA

PROFESSIONAL SUMMARY

A financially astute and proactive leader with a diverse background in accounting and auditing with the ability to effectively manage the day-to-day accounting requirements of an organization. Proven ability to compile, analyze, and provide key financial data to executive management to assist in key business decisions. A hands-on leader possessing strong financial control skills and rigorously ensuring that all corporate and statutory obligations are met. Able to learn and appropriately operate existing practices while identifying and implementing process improvements as deemed necessary.

EDUCATION

Indiana University - Bloomington
December 2003 Kelley School of Business
Bachelor of Science in Accounting and Finance

WORK EXPERIENCE

Key Benefit Administrators Indianapolis, IN
Director of Operational Accounting *August 2015 – Present*

- Strategically oversee, evaluate and manage the responsible managers and team leads for the functions of the department.
- Develop accounting organizational strategies by contributing accounting and financial information, analysis, and recommendations to strategic thinking and direction; establishing functional objectives in line with organizational objectives.
- Accountable for ensuring that policies and procedures (internal controls) are in place to provide reasonable assurance that the company assets are protected.
- Coordinate work relating to both internal and external audits in the periodic review of the company financial records.
- Responsible for the implementation of agreed upon recommendations, related to areas of responsibility, resulting from the audit findings
- Performance management including written periodic staff reviews, establishing written formal performance improvement plans, and written annual evaluations according to Key Family HR and Legal requirements and consultation.
- Assist employees with their development so they may continually grow in their current position/career. This includes mentoring employees so they are capable of running department in manager's absence.

Educational Services, Inc. Carmel, IN
Assistant Controller *December 2014 – August 2015*

- Direct and manage the daily activities of the entire corporate accounting department and monthly accounting close process
- Responsible for coordinating the compilation of information and assist with the management of the quarterly reviews and annual audit of the Company's financial statements by its external auditors
- Work on cross-functional project teams to implement automated refund processes, and assist in developing and configuring a revised student information processing system

- Ensure that financial processes, systems, and controls are functioning as designed and that such processes, systems, and controls provide accurate accounting in accordance with U.S. GAAP and Company policies
- Support and maintain a strong internal control environment in accordance with Sarbanes-Oxley 404
- Approval authority for financial and ledger transactions
- Direct and manage the compilation and analysis of financial information to support business operations
- Participate in department budget discussions to review, analyze, and track financial plans and expenditures
- Assist the financial reporting team as needed for compilation of various footnote disclosure support
- Provide leadership, direction, supervision, and motivation to several senior-level accounting team members

Morningstar, Inc. Chicago, IL

Accounting Manager *July 2011 – November 2014*
Senior Accountant –Shared Services *November 2009 – July 2011*

- Manage the revenue (approx. $450 million annually) and accounts receivable (approx. 2,200 invoices/quarter) processes for domestic operations
- Perform technical reviews on customer contracts to ensure revenue recognition is in accordance with the U.S. GAAP (ASU Topic 605) and Morningstar revenue policies
- As Project Manager/Subject Matter Expert helped lead the functional design, configuration, user testing, and subsequent roll-out of the re-implementation of Oracle R-12 and integration with Salesforce.com
- Lead various project teams (including sales, product management, and finance teams of various business units) and collaborate directly with the U.S. Controller and Global Controller and Chief Financial Officer on initiatives that address business process improvements for billing, revenue, collections, reporting, and other accounting and finance areas
- Process improvements include: System implementation of the Dun & Bradstreet Risk Management Solutions platform for invoice tracking and collection purposes, creation of more relevant revenue, AR, and working capital reporting, execution of auto email notification on customer statements and balance due reminders, development of internal electronic invoice change and write-off indicators, effective maintenance of customer data, and shifting team member responsibilities to better utilize existing skillsets
- Lead and develop accounting team of up to 10 professionals, including four senior-level staff, to ensure efficient invoice processing, cash applications, receivables collection, and revenue reporting and analysis
- Prepare various reports and analysis, such as working capital, cash forecasts, and monthly revenue detail for executive management team review
- Responsible for coordination with external and internal auditors in providing requested support, analysis, and detail for accounts and processed within their testing scope
- Assist the M&A team in various acquisition accounting and business analyses activities as needed
- Responsible for establishing and tracking goals of my team members to aid in their professional development including detailed assessment of annual performance and overall career progression

Grant Thornton LLP Chicago, IL

Senior Associate – Audit Services *August 2006 – August 2009*
Associate – Audit Services *September 2004 – July 2006*

- Managed all aspects of multiple engagements simultaneously, including risk assessment, planning and fieldwork, coordination and instruction of multiple staff, audit of financial statements in accordance with Generally Accepted Auditing Standards (GAAS) and related conclusion requirements with minimal manager / partner supervision
- Prepared financial statements and associated footnote disclosures in accordance with Generally Accepted Accounting Principles (GAAP)
- Oversaw engagements providing extensive exposure to SEC reporting requirements through client filings of Proxy Statements, Annual Reports (10-K), Quarterly Reports (10-Q), Current Reports (8-K), and Initial Registration (S-1)
- Prepared and implemented Sarbanes-Oxley 404 audit procedures to document and test the effectiveness of client internal controls
- Researched technical accounting topics in order to compose and critique technical accounting position papers relating to accounting for complex transactions pertaining to revenue recognition (SOP 81-1, SAB 104, SOP 97-2, EITF 00-21), stock incentive plans (FAS 123R), and goodwill impairment analyses (FAS 142)
- Proactively interacted with key client management to gather information, resolve audit-related problems, and make recommendations for business and process improvements
- Experience in the following industries: Software Sales, Software Consulting, Professional Service, Manufacturing, Retail
- Mentored and tracked the career path of three new hire associates by assessing performance evaluations and completion of individual goals and milestones

BUSINESS SOFTWARE and APPLICATIONS

- Oracle Financial Applications
- Salesforce.com
- Sharepoint
- Hyperion Financial Management and Reporting
- Dun & Bradstreet Risk Management Solution
- Concur Expense Solutions
- Workday Human Capital Management
- Proficient in Microsoft Office Professional Suite

ACTIVITIES and INVOLVEMENT

- Treasurer of The Exchange at the Indianapolis Urban League
- Mentor for the 100 Black Men Financial Literacy Program
- Participant in the Exchange Leadership Fellows Program
- Co-found/Chairman of the Young Professionals Network in NABA (Chicago, IL)

MEMORANDUM

TO: OFFICE OF EDUCATION INNOVATION, OFFICE OF MAYOR JOSEPH H. HOGSETT

FROM: JOEL N. GITHIRI

SUBJECT: TECHINDY CHARTER SCHOOL APPLICATION

DATE: OCTOBER 20, 2016

This memo is intended to indicate my expressed interest in serving in a governing authority capacity for TechIndy School of Science and Engineering. As is evident in my attached resume and below, I provide a skillset and background that brings value to the Board of Directors of the school.

- Over 12 years of financial and accounting experience across multiple industries including not-for profit, auditing, and corporate analysis
- Active participant and mentor in several youth programs designed to advance education and development inside and outside of the classroom setting
- A proven and successful leader with the ability to learn and appropriately operate existing practices while identifying and implementing process improvements as deemed necessary.

I do not have any potential conflicts of interest prohibiting me from serving as a board member for TechIndy School of Science and Engineering. I will be an active and engaged volunteer board member and will not receive compensation for my efforts and involvement. I have no existing contractual relationships with the school.

I am thrilled to be affiliated with TechIndy School of Science and Engineering and look forward to providing a quality education option for students in the Indianapolis community.

Joel N. Githiri

Mahmoud P. Sayani

PROFESSIONAL PROFILE

Executive leader with extensive experience in the private and social sectors, including six years as CEO of Aga Khan Education Service Kenya, three years as Executive Officer of Focus Humanitarian Assistance Canada, and 12 years in senior marketing and project management positions in the technology industry. Track record of success with increasing responsibility in general management, strategy development and implementation, developing and managing budgets and grants, organizational turnaround and change leadership, and working with boards of directors. Qualifications include Ed.M. and MBA.

NONPROFIT and K-12 EXPERIENCE

The Mind Trust, Indianapolis IN ***Jun 2016 to present***
Innovation School Fellow
Developed concept and prospectus for TechIndy School of Science and Engineering.

Harvard Graduate School of Education, Cambridge MA
Ed.M. full-time degree studies ***Sep 2015-May 2016***

- Assisted Harvard professor Linda Nathan in developing an alternative principal training program
- Curriculum Development Assistant for professional course entitled Think-Tank on Global Education
- Group project with MA Department of Education on redefining their Title IIA funding process
- Group project with Save the Children on developing an ECCD policy and program strategy
- Group project with Deans for Impact to developing an assessment strategy for teacher candidates

Coursework included courses in system leadership, policy development, teaching and learning.

Independent Consultant*, Toronto, Canada** ***2012 – Aug 2015
Provide strategic consulting services to a range of clients in the nonprofit sector, including:

- International Baccalaureate Organization – collaborated with virtual team of senior educators to design and develop new webinars, publications, and workshops for school superintendents, boards of directors and executive directors. Service to be piloted with IB's clients in early 2015.
- Harvard University Wide World Online – coached on-line course *Leading for Understanding* attended by teams of school leaders from Hong Kong, India, Barbados, and Brazil.

Aga Khan Education Service Kenya **Nairobi, Kenya**
Chief Executive Officer ***2006 - 2012***
Overall responsibility for nonprofit organization operating 11 private schools in four cities, with 400 staff members and 5,000 students. Provided leadership to all functional areas, including finance, human resources, operations and academics.

- Led financial turnaround of organization through cost-reduction efforts and enhancement of school performance, and market position. Eliminated deficit by third year, improved enrollment by 10% overall, and developed a sustained surplus
- Improved school performance through enhanced focus on student achievement and teacher accountability and development. Initiated structured teacher performance management and motivational incentives, as well as pedagogical enhancements such as the Teaching for Understanding framework, school leadership development, academic policy framework for schools,

and framework for school quality and development. Achievements included: Aga Khan Academy Nairobi consistently obtained top IB Diploma (34 points average in 2013) and Cambridge IGCSE results (100% pass rate in 2011), two Aga Khan high schools placed in the top 100 private schools in the country in the national examinations

- Developed long-term strategic plan for repositioning schools, addressing faculty development, curriculum, and market position. Developed business cases and guided introduction of new curricula at various schools, including International Baccalaureate PYP and MYP, Cambridge IGCCSE
- Managed Kenya School Improvement Program (funded by grant from CIDA), which impacted 137 government primary schools in Coast province through various improvement strategies, including teacher development, cluster approach, and basic infrastructure improvement

Focus Humanitarian Assistance Canada **Toronto, Canada**
Executive Officer ***2003 - 2006***

Overall executive management of non-profit with relief and disaster-resilience programs in South and Central Asia.

- Ensured rigorous implementation of refugee repatriation programme funded by UNHCR, ECHO, US Department of State. Over 5,000 families provided semi-permanent housing, 1,000 people trained in various vocations and placed in jobs, and 1,000 families provided social supports
- Coordinated the development of organizational strategic plan for five units internationally
- Led annual fundraising appeals, exceeding targets, as well as special fundraiser for South Asian tsunami. Obtained first direct grant from CIDA for post-tsunami reconstruction
- Developed structured training in emergency preparedness for volunteers in Canada in conjunction with Justice Institute of BC, as well as training for program officers in humanitarian response

PRIVATE SECTOR EXPERIENCE

Celestica Inc. (Power Systems Division) Toronto, Canada
Director of Marketing and Business Development ***1997 - 2003***

Ascent Power Technology (acquired by Celestica) Toronto, Canada
Various positions, culminating in Director of Sales & Marketing ***1995 - 1997***

Computer Products PCNA Boston, MA
Product Marketing Manager ***1993 - 1995***

Digital Equipment Corporation Maynard, MA
Various positions, culminating in Principal Engineer ***1986 – 1992***

EDUCATION AND TRAINING

Degrees

Ed.M., Harvard University, Cambridge, MA, 2016
MBA (Honors), Boston University, Boston MA, 1993
M.Sc., B.S.E. (Electrical Engineering), Duke University, Durham NC, 1986 and 1984

Certificates

Leading Education Systems at the National Level, Harvard Graduate School of Education**,** June 2011
Leading for Understanding, Harvard Graduate School of Education, Apr 2011
Data-Wise, Wide World On-line by Harvard Graduate School of Education, April 2012
International Faculty Program, IESE Business School, Barcelona, Spain, 2009
Developing Leadership Competencies, IESE Business School, Barcelona, Spain, 2008

Memorandum from School Leader – Mahmoud Sayani

I have previously been the Executive Officer of two non-profit organizations: Focus Humanitarian Assistance Canada and Aga Khan Education Service Kenya, both of which are agencies of the Aga Khan Development Network, an organization with operations in over thirty countries. As Executive Officer of these registered non-profits, I was responsible for overall executive management and fiduciary responsibilities of the respective agency. Focus Humanitarian Assistance Canada was the recipient of grants from the US Department of State, the United Nations High Commission for Refugees, the European Community Humanitarian Organization and the Canadian International Development Agency. This required ensuring financial resources were carefully managed and complying with the audit requirements of the various granting agencies, including the US federal government.

As CEO of Aga Khan Education Service Kenya, I led a network of eleven schools ranging from kindergarten to high schools. Three of these used the International Baccalaureate curriculum – across the continuum from the Primary Years Program to the Middle Years Program to the Diploma Program, the first two of these being introduced during my tenure. One of my achievements at this network was to turn around the financial performance from an organization with a significant annual loss from operations to one making a small surplus. This was done through increasing enrolment, improving the community perception and academic performance of the schools, and rationalizing costs. I also introduced a common pedagogical approach – the Teaching for Understanding framework from Harvard – at four of the schools that used the national curriculum.

These experiences, in addition to my experience in design engineering and marketing in the early part of my career, position me well to lead the founding of the school. To further build my own capacity, I have recently completed a full-time M.Ed. program in learning and teaching at Harvard.

I have no conflicts of interest that will affect my ability to serve as school leader for TechIndy School of Science and Engineering.

Mahmoud Sayani

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